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Training of Health Officers

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The Training of Health Officers*

J. C. GEIGER, M. D., F. A. P. H. A.

Professor of Epidemiology, The George Williams Hooper Foundation for Medical Research, University of California, San Francisco, Calif.

PREVENTIVE medicine is increasingly dominating the thoughts of not only the medical profession but the general public. National health is truly national wealth and full recognition of this will add to the happiness of the nation. Today, the major diseases of yesterday are and can be dimmed to practical insignificance by modern methods of sanitation and immunization. Protection against such diseases as typhoid, smallpox and diphtheria can be obtained and attained without effort or danger.

Unfortunately, the public health movement does not always go forward smoothly and perhaps sometimes intelligently. Any calamity begets reforms. Health is a positive condition but many times its opportunities are overlooked. To be sure, parsimonious activities are first practised in the health department but thrift in expenditures for health matters must be wisely guided. It is perfectly true that half of the general public is not aware of how the other half lives. Ignorance in accepted health principles is inexcusable; therefore, the responsibility of health departments in communicating knowledge regarding such principles is obvious. This educational procedure must be based on facts, and such facts are usually obtained from painstaking research in universities by philanthropic foundations, health departments, and governmental agencies.

As a result of research, one can now appreciate and evaluate the effect of sunlight and proper ventilation on disease, and last but not least, the effect of food. This type of knowledge is invaluable since

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cities are growing larger; transportation facilities are increasing and sometimes more difficult; and the economies of better living conditions are not so easily understood and handled. The scriptures have well said, "As ye go, teach." Life in America is undoubtedly more pleasant and the passing years have seen it markedly prolonged. A vexing problem, however, exists. Health work is primary and fundamentally attached to medicine in all of its many branches. Therefore, the health officer must receive or obtain the broadest training, and today his is the specialty of medicine most unappreciated by organized medicine itself.

Political machinations and interference with the position of health officers frequently lead to changes in the personnel and sometimes in the whole department when the complexion of the political parties changes. That to be a good health officer one must be a graduate physician is certainly not an infallible rule. Some of our excellent health officers and teachers of public health are not physicians, yet this handicap must be fully admitted when put to actual practice by the necessary contact with medicine. Obviously, the trained medical health officer is of paramount importance, but this fact is not taken into consideration by politicians. The history of such political upheavals, however, should constantly guard us against the appointment of the untrained; for the general public generally suffers from an increased mortality or morbidity disease rate. The politician, thick-skinned, hard-boiled, smooth, suave, or of whatever type, listens only to votes and the active, friendless, efficient and scientific health officer is more of a vote liability than an asset.

Until some permanence of office is assured, either politically or by the intervention of organized medicine, trained health officers will be floaters on the sea of politics and usually jetsam and flotsam of the medical profession. This unfortunate fact probably accounts as no other for the unwillingness of the young physician to seek further training in public health; and the lack of effort in many medical schools to permeate their entire curriculum with the spirit and methods of preventive medicine and public health procedures may account in part, at least, for this abortive and somnolent regard manifested by the medical students today.

THE PROBLEM OF THE HEALTH OFFICER

There can be no question that a career in public health does not today offer sufficient attraction, financial or otherwise, to our students or medical practitioners. Perhaps, the passing by Congress of the recent reorganization bill of the U. S. Public Health Service, may

show a trend to better things to be expected elsewhere. Certainly, the need for competent officials is greater than the demand. Three things deter good men: lack of knowledge, inadequacy of compensation, and uncertainty of tenure.

Lack of knowledge as to character of work, and the technical and personal qualifications necessary is bound to react unfavorably on the service performed. The curriculum of schools, medical or otherwise, that give public health courses should be presided over or guided by an experienced and successful health official. Only such an individual is capable of pointing out the advantages and disadvantages of a public health career when compared with private practice. Too often the teacher has the technical requirements but not the practical touch. The student must have it stressed that tactlessness, arrogance, and political subservience are the main pitfalls, with the inability to achieve results along known and safe lines.

Of extraordinary importance is the endorsement of the medical profession of new work to be attempted and the policy of sound financial economy and expenditure. Whenever physicians become interested in public health work, it will be of benefit to the public and to the profession. This kind of endeavor is not by any means a conspiracy against the profession for they gain more than they give.

Political judgment in putting over work is often regarded as a criterion of the successful administrator. Knowledge of disease conditions at home and abroad must remain in the foreground, for the modern health department must teach by the written and spoken word, by exhibits, pamphlets and other propaganda, in order that the seeds of sanitation be planted in the soil of the larger audience.

Two of the modern weapons of health work are bacteriology and epidemiology. Many of our older and sometimes successful health officials regard them as synonymous. As a matter of fact, Lemology or Lemography, meaning the sum of human knowledge as to pestilence, was known long before the science of bacteriology came into existence. The application of these subjects to problems is many times neglected or mishandled by the ordinary health department. Another problem that is often neglected is that of midwifery. It is no vapid utterance that this not unimportant cause of infant and maternal mortality is usually 40 per cent incompetent and uninformed. Furthermore, the use of knowledge by the health official will combat cults, for they appeal, like medicine of ancient days, to the mysterious, the undoable and the unknowable, while modern medicine appeals to the intelligence.

The health official should realize that public health and hygiene

are not entirely medical problems but have economic, sociologic and psychologic aspects.

There can be no doubt that the efficient full-time official is not adequately compensated. Unfortunately, it must be equally realized that as the years pass such an official may become less able to meet the competition of private practice, and once eliminated, the staging of a comeback is exceedingly difficult. Medical men in part-time health department work often complain that such contacts are harmful in establishing practice and good material hesitates to enter even this field. We lose, therefore, many of our best men who can ill afford to enter the domain of public health. The advent of Civil Service regulations in health departments by no means solves this problem for it may act both ways, protect the incompetent, impede progressive thought and work by smug complacency, and be used as a lethal weapon by politically wrong minded boards of control. Rightfully and judiciously applied it offers great possibilities in continued good service by capable men.

This brings up the uncertainty of tenure of office, which acts as a deterrent to entering public health. Many health officials bear in their subconscious minds the sad and repeated history that satisfactory performance of duties is no criterion, and that for political reasons they may be thrown out of office. The adult American intelligence en masse approaches closely that of the grammar school and apparently is woefully lacking in separating political humbug from party policies. There should not be any political interference in health department work and conversely, no partisan decisions by health officials. Well conducted health work very often constitutes an asset that political parties cannot afford to neglect.

The health official must realize no matter how thorough his training and how broad his knowledge, that he should surround himself with the best of assistants, equally well trained, equally well paid, and equally sharing in the published data. The establishment of advisory councils drawn from universities, medical societies and social agencies, appears to be not only necessary but fundamental. Unfortunately, this measure is often regarded with suspicion by politically minded and narrow visioned health officials. Many wholly untrained persons occupy front line positions in public health in the United States, and the trained must depend on a secured solidarity of public opinion based on the education of the community and the medical profession to the necessity of having trained health workers. The politician is not always unwise and the health officer who cannot be an honest, incorrupt one may prove impractical in the final analysis even to politicians.

TEACHING OF PUBLIC HEALTH

The teaching of public health is an argumentative point as to methods of procedure. The advocate of initial training in schools of public health followed by some practical field work either in state, county or city departments apparently has the best of the argument at present. Those who advocate practical experience, preliminary to a collegiate course in public health have been frowned upon because of time limits, financial vicissitudes, and the unwillingness of health departments to recognize this valuable asset of offering such training to their qualified men on leaves of absence.

There has also developed the so-called "in-bred" schools in departments themselves in which new and old employees are trained. This type of training is undoubtedly invaluable for new employees as to certain technical procedures within the department, but its limitations are many when compared to collegiate work in good schools of public health. Perhaps, of greatest importance is the possibility of establishing short courses in these or in medical schools by their own and invited staffs for the training of health officials and the review of pertinent subjects.

It is the modern trend of medical schools to provide instruction along lines of preventive medicine especially in vital statistics, laboratory methods, epidemiology, water and sewage, mental, dental and industrial hygiene, public health administration and education. Unfortunately a usually crowded curriculum perforce must restrict this manner of teaching to lectures. It has become recognized, however, that field trips are necessary to round out such a program. Naturally, such a course cannot be given in its entirety by one individual, as it combines collective and selective knowledge possessed by none or few. Furthermore, the existing facilities of the medical school should be coördinated with those of a well organized health department, be it state, county or city, so that didactic work can be combined with practical training to the benefit of all concerned.

At the Annual Meeting of the American Public Health Association in New Orleans in 1919, a committee of 16, of which the writer was a member, was appointed to consider the subject of standardization of public health training. This committee was cognizant of and in cordial agreement with the expressed idea that the tasks of public health administration require a standardized professional training which would adequately prepare for positions in the public health field and that the possession of such training should be indicated by accredited degrees.

In 1919, Yale University held a conference with representatives of

Johns Hopkins, the Massachusetts Institute of Technology, Harvard, New York University, and the University of Pennsylvania. The committee as well as the Yale Conference came to certain conclusions, practically identical. One of the defects stressed of the system then in vogue was that certain institutions gave not only the certificate in public health but even the doctorate of public health for a course of a few weeks, while others required several years. The committee's opinion was that the first degree should be a Certificate in Public Health, or a Master of Science in Public Health, to be granted for 1 or 2 years of postgraduate work along suitable lines, and the highest degree should be Doctor of Public Health to be granted for not less than 2 years of work in academic residence. Students in the latter course must have the Bachelor or Medical degree, or have satisfactorily completed 2 years in an approved medical school which requires 2 years of college or pre-medical work. The Yale Conference, however, unanimously adopted the resolution that the Doctor of Public Health degree should be for graduates of medicine, and normally awarded after 2 years of work under academic direction, of which, 1 year at least be in residence.

The committee's survey showed 21 schools in the United States and Canada that conferred various degrees in public health, 2 of which allotted them in 36 hours and 6 weeks respectively. Ten schools gave both a certificate and a Doctor's degree in public health. The committee of 16 was replaced by one of 5 members, and in a survey reported October, 1923, the schools conferring degrees in public health in the United States and Canada were reduced to 13 in 1922, but increased to 18 in 1923, 19 in 1924, 21 in 1925, 18 in 1926, and 18 in 1927. These graduated or granted degrees to 66 in 1921, 87 in 1922, 92 in 1923, 98 in 1924, 97 in 1925, 104 in 1926, and 98 in 1927. The University of California in these years reported the conferring of 38 degrees, Yale University 58, Johns Hopkins 267, Harvard 81, Massachusetts Institute of Technology 61, Laval University 10, University of Pennsylvania 17, University of Toronto 30, McGill University 9, University of Iowa 6, New York University 8, and various other universities 1 or 2 degrees each.

About this time short courses were made available in 11 universities and 8 state departments of health. Apparently, in universities the consensus of opinion is that the fundamental subjects to be taught are sanitary and diagnostic bacteriology, sanitary chemistry and biology, vital statistics, theoretical and applied hygiene, sanitary law and legislation, epidemiology, preventive medicine, sanitary engineering and public health administration. To increase the students' perspec-

tive, sufficient postgraduate study in a qualified health department seems necessary. The short courses, however, should cover special subjects by specialists in their fields in the various universities; studies in subjects in state, city or county departments of health; and perhaps correspondence courses arranged in coöperation with both the department of health and the university, and demonstrations in the field.

DISCUSSION

We rightfully revere Louis Pasteur, the real founder of preventive medicine. The revolutionizing of medicine so ably begun by a chemist, was given great impetus by Tyndall, a physicist, and Robert Koch, a bacteriologist. Bacteriology has in turn, revolutionized our isolation and quarantine procedures particularly as to the recognition of the healthy carrier. There is no doubt that Theobald Smith focused attention on the importance of transmission of disease by insects. Biggs really modernized public health practice in the United States.

Scientific medicine and public health are not yet closed books, but to many health officers thinking is yet a painful process. Problems are constantly coming up and awaiting solution. One of these is that of trained personnel in public health. Health departments may acquire funds and secure legal power, but expert knowledge, enthusiasm and personal and political integrity are needed in order to obtain maximum results. The mediocre and untrained health officer will always be with us. Nevertheless, the most deeply important phase of the matter and of the future is to make serviceable the sympathetic and active efforts of organized medicine.

The full-time health official has no petty position—his duties are not dribbling matters and his remuneration should be adequate. Many universities have foreseen the need of such training and there is no lack of facilities. The recruiting of the medical profession is, however, sadly lacking and most needed. The newer phases of public health must perforce receive the application of medical knowledge to the detection and prevention of disease. Jordan, in 1922, showed that out of 461 students replying to a questionnaire, 358 had never even considered entering public health work. Moreover, the replies indicated prejudice against this type of work.

A questionnaire was recently submitted to the junior and senior classes of the medical school of the University of California, and apparently there has been no change in opinion. For instance, the answer to the question "Do you intend to take up public health as a career?" was unanimously in the negative, and it was invariably stated that politics and insufficient remuneration guided the decision.

In fact, one answer carried this cryptic statement: "The health officer is too frequently a glorified policeman; and the position too thankless and too poorly paid." One redeeming feature of these answers, however, was the obviously inherent desire to assist the health officer in reporting disease and work in harmony with any program for the prevention of disease. Many students confessed to knowing very little of the health organization in their home city, county or state and when they did show some familiarity, it was the hackneyed pious type of phrase—too much politics.

Presumably, the health officers of the Pacific Coast and slope are not sufficiently well acquainted with medical students—at least, at the University of California—to impress them with their objectives or their methods, nor are their instructors quite able to interest them or remedy this condition without active contact with health departments. In this connection, a health department which has one of the best balanced organizations and an unsurpassed record for achievement, research and activity—that of Detroit—makes this interesting assertion:

> The health department has several assistants under training at all times and makes a special point of taking young and promising students from such schools as the University of Michigan, Massachusetts Institute of Technology, and Johns Hopkins School of Public Health. There are four such men on our staff at present working for higher degrees in public health. In addition to this, all Bureau and Division heads are well trained men who are continually availing themselves of opportunities to improve themselves in their specialized field. Moreover, we are great believers in well trained executives and have on our staff men of national reputation in communicable disease work, laboratory, tuberculosis, health administration and epidemiology, venereal disease and sanitary engineering. Likewise, this department coöperates in teaching preventive medicine and public health at the one class "A" medical school. All senior students have a course in communicable diseases, tuberculosis, and maternity service at the Herman Kiefer Hospital. Internes have these same services.
>
> Lectures on preventive medicine and field demonstrations are given to third and fourth year medical students by members of the staff of the health department. Senior students are in daily attendance at our venereal disease and tuberculosis clinics where they receive personal instructions. The staff also gives lectures in public health administration at the University of Michigan in Ann Arbor both during the school year and in special summer institutes.

The Department of Health in Chicago, at least in years past, covered the same activities but for 4 class "A" medical schools. The future of such work is naturally problematical, but such a department is wholly fulfilling its obligation to preventive medicine. One may go so far as to build around the medical school an active ideal health department unit with its own personnel where practical experience may be given students, nurses, etc. This type of unit, however, can only

be established when the health department has far-seeing executives who can appreciate the value of such mutual contact.

Of more than passing interest is the fact that hospital nurses should come to graduation with a practical knowledge of bacteriology, epidemiology, and public health. Too often their instructors are technicians or members of the hospital staff years removed from the subject, or staff nurses selected because of their inadaptability for other duties. It is perfectly true that prescribed courses are mentioned in the curriculum for hospital nurses but it is not infrequent that the course in bacteriology, at least, is given without the student obtaining actual laboratory experience. It is likewise true that hospital nurses are not intended to be bacteriologists but their varied duties are such that sterile technic at the bedside and in the operating room is dependent upon existing bacteriologic flora and a workable knowledge of the reasons for possible contamination and the contaminants is necessary. Just as necessary are the fundamentals of the epidemiology and public health measures to be used to combat disease. The nurse is quite frequently the confidant and companion of the patient and the understanding of questions with their proper answers is equally as important as is sympathy and bedside care. Superintendents of hospitals should carefully scrutinize such instruction in order that the graduate nurse will have adequate familiarity with laboratory technic and public health procedures.

It can be generally admitted that practically every disease affecting the human being is susceptible to some measure of control. The health officer of the future must assume the responsibility of guiding the attack on these. Control does not mean the application of police power, the making and passing of new ordinances, or presuming that ordinary quarantine is continuously effective. The medical profession should have intelligent and serious regard for such matters and give their active coöperation. Likewise, the medical school must realize that in the undergraduate curriculum, a place of importance must be given to preventive medicine. The time of placement is of equal importance, and perhaps such teaching should be concentrated on the fourth year. As an offshoot of the year when bacteriology is usually taught (second year), special field problems could be offered with possibly apprentice work in health departments. Moreover, all teachers of medicine should conform their courses with the newer accepted ideas that the duty of the physician is to promote health and prevent disease.

The health officer is perfectly well aware that 30 per cent or more of confinements occur without medical attendance. As a result the

toll of death among about 3 million women from abortion, miscarriage, premature labor, or accident at delivery, is such that its ultimate effect is felt everywhere. The health officer is also aware of 700,000 cases of communicable and preventable diseases in children; the problems of malnutrition involving at least 4 millions more; the problems of physical defects such as those of vision, adenoids, tonsils and teeth involving at least 20 millions—so surely preventive medicine in its larger vision is the untried but profitable future of practice to make the unfit fit and to keep the well well.

Finally, it never seems to occur to anyone that one cannot make a public health administrator through the medium of a college or a degree. Unfortunately, the best administrative officers are born and not made, and it is only the experience of sad errors and contact with the efficient that make some health officers "practical" administrators. Indeed, years ago one of our learned professors made the statement that powers of observation rather than books, and experience rather than teachers or persons, are the prime educators. Frankly, as far as the problem of public health education is concerned, the training should start, at least, from the laboratory. Certainly, a person classified as a public health administrator without some definite medical training is like a ship without a rudder; yet, it is not unlikely that a person so devoid of such training will often write of the epidemiology, prevention, and even the curative aspects of disease. By analogy, obstetrics could just as well be written by an engineer.

In closing, it may be well to point out that the public health problems of the West differ in some respects from those in other parts of the United States and, therefore, the health officer of the West should interest himself in developing investigative material and men by friendly coöperation with the medical schools of his community. The medical school of the University of California would welcome such an opportunity for service and research.

Home Pasteurization of Milk

LLOYD ARNOLD, M. D., AND C. J. GUSTAFSON

Research Laboratories, State Department of Public Health and College of Medicine, University of Illinois, Chicago, Ill.

THE advantages of pasteurized milk need not be dwelt upon in this JOURNAL. Our purpose is to report experiments upon the use of vacuum and insulated heat retaining bottles to pasteurize milk in small quantities suitable for home use. This is a part of a program of the Illinois State Department of Public Health to reduce infant mortality in communities too small to enjoy the benefits of commercially pasteurized milk.

Illinois has an approximate population of 4 million people living outside of the city of Chicago, at least 70 per cent of which uses raw milk.

A recording thermometer was used for these experiments. The readings were checked with certified mercury thermometers. Water, milk and other fluids were heated to various temperatures and placed in vacuum vessels of various sizes and types, and the heat retaining efficiency of each vessel graphically recorded on a circular ruled paper by a moving writing point, moved by a time clock. The results are presented in tables, calculated from averages from the time and temperature graphs. The temperatures varied from 100° to 200° F. We are only concerned in this article with those temperatures that are of practical use in the pasteurization of milk for human consumption.

Milk was heated in an open vessel to a given temperature, then placed in a vacuum bottle and the heat retaining efficiency of the closed vacuum vessel determined. Such a vessel can act as an incubator under certain conditions. The object of our experiments was to find a vessel of the proper size that would retain the heat of the milk for the longest period before it served as an incubator for its contents.

This part of the problem divided itself into 3 factors: (1) duration of the holding or pasteurization temperature; (2) length of time that the milk would be warm but wholesome; (3) time when the vessel cooled to a degree that would incubate its contents.

When the continuous recording thermometer is used over a long

TABLE I

TOTAL NUMBER OF EXPERIMENTS CARRIED OUT USING MILK IN VACUUM AND INSULATED VESSELS OF VARIOUS SIZES WITH CONTINUOUS GRAPHIC TEMPERATURE RECORDS

	Experiments
½ pint vacuum bottle	10
1 pint vacuum bottle	22
1½ pint vacuum bottle	14
1 quart vacuum bottle	32
2 quart insulated bottle	12
1 gallon insulated jug	10

TABLE II

TEMPERATURE RECORDS OBTAINED WITH CERTIFIED MERCURY THERMOMETER AND RECORDING THERMOMETER IN SAME 1 QUART VACUUM BOTTLE AT HOURLY PERIODS FOR 13 HOURS. BOTH THERMOMETERS REGISTERED 145° F. AT BEGINNING OF EXPERIMENT

Hours	1	2	3	4	5	6	7	8	9	10	11	12	13
Mer. Therm. ° F.	142.5	140.5	138	136.5	134	132	130	137.5	125.5	123	121.5	118.5	117
Rec. Therm. ° F.	141	138	134.5	131	129	126	124	122	119.5	117.5	115.5	113	111

period there is a certain loss in heat in the conducting system. Table II shows the differences in the readings obtained upon the same vacuum bottle with the use of the continuous recording thermometer and a certified mercury thermometer for 13 hours. Table III indicates the heat retaining properties of 6 vacuum and insulated vessels used. These are the averages obtained from 100 experiments indicated in Table I.

As mentioned, the 2 important factors to determine were the holding time between 145° and 140° F., and the duration of time between

TABLE III

MILK WAS HEATED TO 145° F. IN OPEN VESSEL AND POURED IMMEDIATELY INTO VACUUM BOTTLE OF SAME TEMPERATURE. THE TEMPERATURE OF THE CONTENTS OF THE VACUUM VESSEL WAS RECORDED AT HOURLY INTERVALS

	Pint			Quart		
Hours	½	1	1½	1	2	4
1	117.5	138.5	140.5	141.5	141	137
2	101	133	136	138	137	132
3		128.5	132	135	134	127
4		124	128	132	131	122.5
5		120	124.5	129	129	118.5
6		116.5	121	126.5	127	114.5
7		113	118	124	125	111
8		110	115	122	123	107.5
9		107.5	112	119.5	121.5	103.5
10		104.5	109	117	120	100
11		102	106.5	115	118	97
12				113	117	94
13					115	92
14					114	90
15					112.5	88

140° and 115° F. Table IV gives this in condensed form for the 6 vessels used. These results are averages of 100 experiments outlined in Table I.

It will be seen from Tables III and IV that the 1 quart vacuum bottle is a very efficient instrument for pasteurizing milk. The 2 quart vessel is insulated and the cost is out of proportion to its size when compared with the 1 quart vacuum bottle. The ½ pint and the pint vacuum bottles, and the gallon insulated jug should not be used for home pasteurization for two reasons: (1) the holding time between 145° and 140° F. is too short, and (2) the length of time between 140° and 115° F. is too short for safety.

TABLE IV

LENGTH OF TIME THE MILK WAS SUBJECTED TO PASTEURIZING TEMPERATURES (145° TO 140° F.). LENGTH OF TIME THE MILK WAS HELD AT TEMPERATURES BELOW PASTEURIZATION POINT, BUT BEFORE BACTERIAL MULTIPLICATION BEGAN

	Pint			Quart		
	½	1	1½	1	2	4
Length of time 145° to 140° F.	8 min.	45 min.	1 hr. 5 min.	1½ hrs.	1 hr.	35 min.
Length of time 140° to 115° F.	1 hr. 8 min.	5 hrs. 40 min.	6 hrs. 55 min.	9½ hrs.	12 hrs.	8 hrs. 20 min.

Various bacteria have been added to the milk to test the efficiency of this method of pasteurization. Most of these experiments have been carried out with the quart vacuum bottles. The bacteria were added to 2 quarts of milk, heated to the temperatures indicated, and put into two 1 quart vacuum bottles—1 c.c. samples were removed after 30, 35, 40 and 45 minutes. The results are given in Table V. Each organism was used for 3 experiments and each experiment was run in duplicate; hence, the bacterial counts on each line in Table V represent an average of 6 counts.

We found that the porcine strain of the *B. abortus* was the most resistant of any of the bacteria tested. We have not used the *B. tuberculosis* in these experiments, as there are many observations recorded upon its thermal death point. If the milk is held between 145° and 140° F. for 1 hour there is a wide margin of safety and it will be free of pathogenic bacteria. Table VI is similar to Table V, except that we used the ½ pint vacuum bottle. Tables III and IV show the short period that the milk will be held at pasteurizing temperatures in this small vessel. This accounts for the inefficiency of the ½ pint vacuum bottle (Table VI) as compared to the quart bottle (Table V) for pasteurization purposes.

TABLE V

BACTERIA ADDED TO MILK, HEATED TO TEMPERATURES INDICATED AND PUT IN 1 QUART VACUUM BOTTLE. BACTERIAL COUNTS MADE UPON 1 C.C. SAMPLES AT INTERVALS INDICATED

	No. of Organisms per c.c.	Temp. F. of Milk at Start in Bottle	30 min. Colonies	30 min. Temp. F.	35 min. Colonies	35 min. Temp. F.	40 min. Colonies	40 min. Temp. F.	45 min.
B. Diphtheria	5,000,000	145	0	144					
B. Typhosus	5,000,000	145	0	143.5					
Strep. Epiderm.	4,000,000	143	0	141					
Staph. Albus	9,000,000	144	0	143					
B. Abortus Caprine	2,000,000	145	0	143.5					
B. Abortus Cow	3,000,000	145	0	142.5					
B. Abortus Porcine	5,000,000	142	400	141	0	141	0	141	0
*B. Abortus**	5,000,000	140.5	300	139	40	139	0	139	0
*B. Abortus**	5,000,000	141.5	800	140.5	0	140.5	0	140.5	0
*B. Abortus**	9,000,000	145	0	144	0	144	0	144	0
*B. Abortus**	9,000,000	139	800	138	500	138	0	138	0
*B. Abortus**	25,000,000	147.75	2,000	146	200	146	0	145.5	0
*B. Abortus**	5,000,000	143	0	142					
*B. Abortus**	5,000,000	143	0	142					
*B. Abortus**	5,000,000	145	200	144	0	144	0	143.7	0
*B. Abortus**	2,000,000	145	0	143.5	0	143.5	0	143	0
*B. Abortus**	7,000,000	145	400	144	0	144	0	144	0
*B. Abortus**	5,000,000	145	0	144	0	143.6	0	143.4	0
*B. Abortus**	5,000,000	145	100	143.4	0	143	0	142.6	0

* *B. Abortus Porcine.*

Table VI shows that 115° F. is the lowest temperature at which milk can be held in vacuum bottles before bacterial multiplication begins.

We thought it advisable to use some other indicator for temperatures than the mercury thermometer for the home pasteurization, since initial cost and probable breakage would not aid in the widespread use of this procedure. We have developed two indicators that will replace the mercury thermometer and can be used by the mother in the kitchen. Palmitic acid has a melting point of 145° F. Sealed in an ampule it changes from an opaque to a water clear color when 145° F. is reached. Thin glass tubing 11 mm. in diameter has been made into ampules approximately 45 mm. long, into each of which 400 mg. of palmitic acid was placed, then sealed.

An ampule is dropped into the milk in a pan on the stove. During heating the milk is constantly stirred with a clean spoon. When the floating ampule becomes colorless the temperature has reached 145° F. In our experiments the actual temperature of the milk is seldom less than 147°, and at times 149° F. This is because of exposure of part of the ampule to the air and the poor conductivity of the glass.

TABLE VI

BACTERIA ADDED TO MILK, HEATED TO TEMPERATURES INDICATED AND PUT IN ½ PINT VACUUM BOTTLE. BACTERIAL COUNTS MADE UPON 1 C.C. SAMPLES AT INTERVALS INDICATED

Organisms	Bacterial Colonies									
	Control	145° F.	140° F.	135° F.	130° F.	125° F.	120° F.	115° F.	110° F.	105° F.	100° F.
B. Typhosus	5,000,000	0	0	0	0	0	0	0	0	0	0
Brucella-cow	14,000,000	3,300	2,300	1,200	0	0	0	0	0	0	0
Brucella-porcine	4,000,000	2,100	2,000	1,500	100	0	0	0	0	0	0
Brucella-caprine	2,000,000	0	0	0	0	0	0	0	0	0	0
Staph. Albus	80,000,000	6,600	2,600	2,200	0	0	0	0	0	0	0

TABLE VII

BACTERIAL COUNTS OF 1 QUART SAMPLE OF FRESH MILK IMMEDIATELY AFTER HEATING AND POURING IN VACUUM BOTTLE AND AFTER TIME INTERVALS NOTED. TEMPERATURES TAKEN AT TIME BACTERIAL COUNTS ARE INDICATED

Hours	At start	3½	6½	9	12	16	21	25	28
Temperature	146.75° F.	140	135	130	125	120	115	110	108
Colonies	300,000	0	0	0	0	300	1,800	7,000	300,000

Inasmuch as the cream line is of no importance in this method we have considered the added temperature of 2 to 4° above 145° advantageous. The second indicator is menthol. A glass tube 4½ mm. in diameter, of approximately 8″ in length, is blown out at one end into a bulb, into which menthol is placed and the open end of the tube sealed. Menthol changes from an opaque substance to a clear fluid at 108° F. This indicator is for the purpose of determining if the vacuum bottle has become an incubator. When it is suspended in the milk and remains opaque the milk is not to be used for human consumption. If it changes to a clear fluid the milk is still safe for use. The equipment necessary to carry out this method of pasteurization will cost less than $3.00. We give the detailed instructions as to the technical procedure.

EQUIPMENT

1. Pan of more than 1 quart capacity with side lip to facilitate pouring of milk from pan into bottle
2. Vacuum bottle of 1 quart capacity
3. Temperature indicator (No. 1) for pasteurization in sausage shaped glass tube
4. Temperature indicator (No. 2) for cooled milk—a long glass tube with bulb on end

PASTEURIZATION TECHNIC

1. Clean out vacuum bottle with hot soap water several times. Rinse well with water about 160° F., fill bottle with this water and let stand.
2. Wash the stopper of the vacuum bottle well, put it in a small pan of water

and boil for 10 minutes. Pour water out of pan carefully, leaving the clean stopper in the empty pan.

3. Clean a pan well and pour 1 quart of fresh clean milk into it. Milk should be free from dirt and less than 12 hours from the cow.

4. Drop indicator No. 1 into the milk. Place pan on the heated stove and bring temperature of milk up rather slowly, stirring constantly with a clean spoon.

5. When the indicator No. 1 becomes transparent, the temperature of the milk has reached 145° F. Remove milk from the stove. Take out indicator No. 1 with spoon and put on table.

6. Pour the hot water out of the vacuum bottle.

7. Pour the hot milk into the heated vacuum bottle. Stopper the bottle.

8. Set the vacuum bottle in a warm cupboard in the kitchen and leave it there until the milk is to be used.

9. Do not use this milk until it has stood in the vacuum bottle for at least 1 hour.

10. Use the indicator No. 2 (with glass stem) to determine whether the milk in the vacuum bottle is warmer than 115° F. Hold the end of the glass tube in the hand and put the opaque bulb down into the milk in the vacuum bottle. Hold it in the milk for 2 to 4 minutes. If it is above 115° F. the bulb will clear. If below it will be opaque.

11. If the milk is at a temperature above 115° F., pour out enough to make a feeding. Replace the vacuum bottle and the remainder of the milk in the cupboard.

12. When the milk in the vacuum bottle becomes cooler than 115°, it should be discarded.

The thermal death points recorded in this experiment have been determined by using the vacuum and insulated bottles. Our problem was to determine the thermal death point of bacteria using the method we have suggested for pasteurizing milk in the home.

One Murder in Year Norway's 1928 Record

UNITED States cities where the murder rate has shown a tendency to jump in recent years might profit by studying conditions in Norway, according to figures presented recently before the Commons Committee on Capital Punishment, which show that Norway had only one murder in 1928.

And the tendency is decreasing, due to abolition of the penalty of capital punishment, M. Kristian Hannson, secretary of the Norwegian prison commission, told the committee.

Growth of culture, a higher standard of living, and better police organization were given by Mr. Hannson as explaining the decrease in crime.

Punishment for premeditated murder in Norway is from 6 to 20 years. Good conduct men can be released after serving two-thirds of their sentence.

Boulder Dam Symposium*

The Sanitary Engineering Aspect

LEON B. REYNOLDS

Professor of Sanitary Engineering, Stanford University, Stanford University, Calif.

THE Colorado River has been declared to be the largest remaining undeveloped asset possessed by the United States Government within the public domain. Certain it is that the river, if regulated and controlled, would be the source of great wealth and service, while in its present condition it possesses the power of great loss and destruction.

With a length of 1,750 miles and a drainage area of 242,000 square miles in the United States and 2,000 in Mexico, the Colorado ranks as our third largest river. Formed by the junction of the Green from southwestern Wyoming and the Grand from western Colorado, it has its main source in the rain and snow precipitated in the high Rockies. Leaving these altitudes, it flows through a succession of deep canyons receiving appreciable amounts of water from other tributaries, finally reaching the California line. Along the California-Arizona line south the river opens up into a series of narrow valleys of low altitude with arid climate, and eventually empties into the Gulf of California. For centuries the river has been building up a delta across the Gulf with the result that the north end which formerly extended to Indio was long ago cut off.

The flow of the present unregulated river at Yuma is subject to great variations; the annual discharge has varied from 8,000,000 to 26,000,000 acre-feet; and the average at the Black Canyon dam site (commonly called the Boulder Dam) is 16,200,000; variation in seasonal rate of flow is also great, from 1,250 to 200,000 second-feet actually measured and up to 500,000 estimated. Floods are deliberate rather than flashy in character, being due to melting snows, and occur from May to July; minimum flow occurs from September to December.

Use of the river for irrigation development has so far been made without a comprehensive plan for the entire stream. Some half dozen

* Presented before the Western Branch, American Public Health Association, at the First Annual Meeting at Salt Lake City, Utah, June 14, 1930.

projects have been developed along the California-Arizona line with a total irrigable area of 867,000 acres, about three-fifths of which is in Imperial Valley with a population of over 60,000, about half of which is rural. The reclamation of this land has not been easily nor cheaply achieved; constant vigilance has been necessary to prevent a repetition of the break in the levees which occurred in 1905 when the river for 18 months flowed into the Salton Sea. Silting has raised the river bed about one foot per year until it now flows confined by levees on a silt ridge 300 feet above the lowest point of the Valley. Overtopping of levees is an annual menace with each year adding to the danger.

The river has been observed and studied since the close of the Civil War, but has been intensively surveyed for the last 10 years. The present plan for regulation by a dam at Black Canyon has a five-fold object: (1) flood control for the lower basin, (2) desilting of the water, (3) conservation for irrigation use, (4) conservation for domestic use, and (5) development of hydro-power. This discussion is concerned primarily with the use of the water for domestic purposes which may be construed to include industrial purposes.

In the lower basin the present users of the water for domestic purposes include the cities of Needles and Yuma, also 11 communities of the Imperial Valley which take their supplies from the irrigation canals. Of the latter, El Centro for purification uses long subsidence and slow sand filters; Calexico has long subsidence, coagulation and rapid sand filtration; while Brawley, Imperial, Holtville, Niland, Calipatria, Heber, Seeley, Dixieland and Westmoreland employ long subsidence only. Chlorination is practised by 6 of the cities.

The metropolitan district around Los Angeles is the important prospective user of the flood water to be conserved by storage behind Boulder Dam. When the construction of its 250-mile Owens River aqueduct was begun 25 years ago, the city of Los Angeles had a population of 160,000 and it was thought that the Owens River supply of 400 second-feet would suffice for two generations and a population of 2,000,000. During the past 15 years, a cycle of subnormal rainfall has been experienced during a period of unprecedented population growth, and far-seeing engineers have been warning the city that it was making an overdraft on its water resources. Realizing that ample water supply was vital for continued growth, Los Angeles filed claim for 1,500 second-feet of Colorado River flood water whenever it should become available, which is estimated to be enough for 7,000,000 people.

Surrounding cities, experiencing a similar rapid increase of population, and realizing the urgent need of an additional water supply,

joined Los Angeles in the formation of the Metropolitan Water District. A recent Los Angeles city bond election has provided funds for extension of the Owens River system, but it is felt that the Colorado River is the only source of sufficient magnitude for the future.

The District is now making surveys to determine the most feasible location for the diversion, and the choice seems to lie among four general routes varying from a long gravity line from the reservoir itself to a shorter line from the river below with high pumping lift (around 1,500 feet). We may assume that the probable diversion will be either from the reservoir itself or from the river below, somewhere between Black Canyon and Yuma.

The potability of the Colorado River water for domestic use is the question to be discussed in this paper. In the consideration of the quality of water for domestic uses attention should be given to the physical, chemical, and bacteriological content; some constituents may have significance only from the esthetic, some from the economic and some from the health standpoint.

PHYSICAL AND CHEMICAL CONTENT

Physical characteristics of water include its color, taste, odor, and turbidity. There would seem to be little likelihood of Colorado River water being colored, inasmuch as color is primarily due to dissolved organic matter and the drainage area is not characterized by heavy growth of vegetation, fully half being bare or scantily covered with desert shrubs and grasses. Taste and odor, due to growth in the reservoir of certain organic or plant life, particularly algae, cannot be predicted prior to actual storage of the water but seems unlikely and can be combated if necessary by aeration at the entrance to distribution storage, at the consumptive centers. Turbidity is a matter of considerable interest with reference to the Colorado River water, although suspended matter, taste, odor, and color are of only indirect hygienic significance.

The Grand Canyon has been called the greatest natural silt mill in the world, the silt produced being finely pulverized rock. The entire problem of the relation of Imperial Valley to the project may be said to be one of silt; the silt content has sanitary significance in connection with the necessary treatment of the water for domestic use. Tests of silt percentage by weight made by the U. S. Geological Survey at Grand Canyon gave the following results: October 1, 1925, to September 30, 1926, minimum 0.03 per cent, maximum 3.55 per cent, weighted average 0.56 per cent; for the year 1926–1927, minimum 0.04 per cent, maximum 13.81 per cent, weighted average 1.09 per

cent; for year 1927–1928, minimum 0.03 per cent, maximum 2.92 per cent, weighted average 0.63 per cent. The figures for these 3 years show that the suspended matter may average as high as 10,000 p.p.m. with peaks as high as 138,000 p.p.m. It is reported that water in the Imperial canal system reached 26 per cent silt content in September, 1929. On the basis of a weight of 85 lb. per cu. ft. the U. S. Department of Agriculture estimates that the river carries past Grand Canyon an average of 253 million tons per year, or a volume of 137,000 acre-feet, as much as the total excavation removed by Americans from the Panama Canal; of this total some 15,000 acre-feet are deposited in the Imperial canal system, costing the farmers over $1,000,000 yearly for cleaning ditches and relevelling land. The Boulder Dam will provide storage of 26,000,000 acre-feet, allocated as follows: silt storage 7 million, water supply 10 million, flood control 9 million. If no upstream storage is developed in the meantime, this silt storage may be filled in 50 years and the entire reservoir in 200 years.

After the construction of the Boulder Dam a reservoir 90 miles long will be formed and, as soon as the velocity of the water is stilled in the reservoir, sedimentation will become effective. The 11 water systems in the Imperial Valley provide sedimentation periods ranging from 2 to 10 days, and tests of 222 samples by the California Department of Health showed 96.7 per cent average removal of suspended matter. At Calexico 3 to 5 days' storage is provided the year round, but it seems to be insufficient during flood season, possibly due to colloidal material; at Brawley, as a rule 95 per cent of the suspended matter goes down in 2 hours, but at certain times it will not settle in 1 or 2 days. Apparently it may be expected that rather complete clarification may be effected during the long storage behind the Boulder Dam. Therefore if Los Angeles should decide to tap the reservoir for its supply, a well clarified water should be available. If, however, the supply should be obtained by diversion without storage at some point far down the river toward Yuma, clarification would be necessary. Tests indicate that some of the silt carried by spring floods is now deposited in the 100 miles between Black Canyon and Topock. Silt in the lower river will undoubtedly persist for several years after the dam is built as the water picks up this accumulated silt and carries it onward. The Imperial Valley irrigation system will secure relief from its floods of silt as well as its floods of water, and the domestic water supplies will benefit likewise; some silt may be expected for the first few years as picked up below the dam.

The quality of Colorado River water as to chemical content is of interest from the standpoint of use for irrigation, for industries, and

for domestic purposes. The U. S. Geological Survey, since October 1, 1925, has been analyzing daily samples collected at Grand Canyon, Topock, and Yuma. An average weighted on the basis of quantity of flow indicates approximately the quality of the water held in a reservoir which would store all the flow and after the water was thoroughly mixed. Analyses at Topock and Yuma are very similar to those at Grand Canyon. The weighted averages for the years 1925–1926, 1926–1927, and 1927–1928 show comparatively little variation, and the figures quoted below are the straight averages of the weighted averages for these 3 years at Grand Canyon.

The total dissolved solids were found to be 528 p.p.m. and the average load of dissolved material carried by the river has been computed to be 31,370 tons per day. While the U. S. Treasury Standard sets the limit at 1,000 p.p.m., nevertheless the statement is made that "a water of the highest quality should have less than 300 p.p.m. of total solids and water with more than 750 p.p.m. is unsatisfactory for boiler purposes." Hence it must be recognized that the Colorado water is normally higher than desirable in dissolved mineral salts.

The average total hardness was 263 p.p.m.; bicarbonate radical was 161 p.p.m.; and sulphate radical was 208 p.p.m. The U. S. Treasury Standard for the latter is 250 p.p.m. Hence it may be seen that while the permanent hardness of the Colorado water is below the limit set, nevertheless it approaches the limit. No standards have been set by the U. S. Treasury Department for total hardness and opinions differ with regard to the proper adjective to apply to hardness. Probably due to the remarkable development during recent years in the field of water softening, there seems to be a tendency toward more rigid interpretations. In U. S. Geological Survey *Paper 496*, waters with hardness of 200 to 500 p.p.m. are classed as "hard to excessively hard," while Babbitt in his new text calls 230 p.p.m. "excessively hard" and 250 p.p.m. he calls "too hard for use."

There are now 110 cities in the United States furnishing a softened or partially softened supply, among which is Beverley Hills where a well water having a hardness of 200 to 340 p.p.m. is softened to 80 p.p.m. Until recently a reduction by the lime process of softening to 50 to 60 p.p.m. was considered as good as could be secured, but it is now possible to reduce carbonate hardness to 20 p.p.m. The public is realizing the advantages of soft water as well as clear and safe water, and indifference is being replaced by insistence upon soft supplies.

The iron content of the Colorado water averaged 0.23 p.p.m. while the U. S. Treasury Standard is 0.3 p.p.m., beyond which complaints of deposits and staining are to be expected.

The chemical constituent of Colorado water about which there has been most controversy is chlorine. The content of common salt for the 3 years already quoted averaged 85 p.p.m. The U. S. Treasury Standard for salt content is 400 p.p.m. Various authorities place the border line where salt can be detected by taste from 200 p.p.m. up to 800 p.p.m., or even more. Collins of the U. S. Geological Survey says that few people can detect less than 600 to 800 p.p.m.; Whipple set the limit at 200 p.p.m.; and Dr. Wilson of Los Angeles at 400 p.p.m. Collins states that water may be considered good if it contains less than 400 p.p.m. salt. Accordingly the weighted average of Colorado water indicates that while the salt content of the present stream flow is considerable, nevertheless it would fall far short of the amount detected by taste.

The matter under controversy is not the present salt content but the probable salt content after the dam is built and the reservoir created. Salt deposits exist in the area to be flooded, especially in the Virgin River basin, and the probable effect of their submergence is a matter upon which geologists and engineers are not in agreement.

In 1922 Prof. Ransome, now of California Institute of Technology, made a preliminary study of the salt deposits for the U. S. Geological Survey and estimated that they might amount of 25,000,000 tons, most of which would be submerged. About 4 months ago he transmitted to the U. S. Geological Survey an extensive report based on a thorough reëxamination. He contends that the rock salt deposits are stratified; were deposited under arid conditions in a closed basin; and are exposed in cliffs varying in quality from pure to more or less silty salt. He contends that buried salt deposits if present are protected from solution by sediment; that the exposed area of deposits is generously estimated at 22 acres; and that the rate of solution after submergence would depend on area of contact, concentration of solution and temperature. In order to arrive at a rough approximation of rate of solution he performed experiments with blocks cut from the deposit which showed a beginning rate in standing water of 15 ft. per year, decreasing with longer periods of time. Assuming circulation of water in contact, no interfering silt blanket and no hastening of the process by porosity—none of which are in accordance with the facts—he determined that 15 ft. solution on 22 acres will increase the salt content of a full reservoir by 21 p.p.m. He considers this improbable and extreme even for the first year, and asserts that deposition of silt from the water and slumping of the overburden on the salt cliffs will seal the deposits and progressively decrease the rate. Other eminent geologists and engineers—the Colorado River Board, the Special Com-

mittee of Los Angeles Chamber of Commerce, and the Metropolitan Water Board—share and agree with Prof. Ransome's opinions. The Metropolitan Water Board is now conducting detailed surveys and examinations of the locality.

As opposing the majority views may be mentioned E. C. LaRue, Hydraulic Engineer, and C. K. Fox, Consulting Engineer. The former believes that "the amount of salt carried at present is considerable and that any additional amount would be detrimental to agriculture where the water is continuously used for irrigation." The latter contends that the salt deposits were laid down in the bed of an ancient sea; that rock salt deposits exist 100 ft. thick and 30 miles long, that their amount may be as high as 25 billion tons; that the Colorado River and Virgin River gravel beds are salt-bearing and that 5,000 p.p.m. salt in the reservoir water may be the contribution from these sources.

The salinity of the reservoir water seems to be the constituent of most uncertain amount, but most authorities believe that the increase due to salt deposits will be inappreciable. However, any increase cannot be offset by any form of treatment; it has been said that anything can be removed from water except salt and politics!

From the standpoint of chemical content, therefore, the Colorado River water cannot be said to be first class. C. S. Howard in U. S. Geological Survey *Paper 636-A* says:

> Clarified Colorado River water is nearly always satisfactory for drinking. It will serve for all ordinary domestic uses but does not attain the standard of quality generally demanded for a modern public water supply. The hardness of the water of the public supplies of Boston, New York, and many other cities is less than one-tenth of the average hardness of the Colorado water.

The Colorado River Board, consisting of five engineers and geologists, reported as follows:

> The waters of the Colorado are normally high in dissolved mineral salts, chiefly carbonates, sulphates and chlorides. The amount is well within the limits of accepted practice for irrigation purposes. For domestic use the salt content is high; it is not an ideal water for such purposes but the fact that it is usable is demonstrated by its use in the cities of Imperial Valley and in Yuma and other communities along the lower Colorado.

Bulletin 17 of the California Department of Public Works, *Coordinated Plan of Water Development in Southern California,* contains this statement:

> While the mineral content of Colorado River water is greater than would be desired if a choice in supplies were open, the lack of surplus water in the nearby

regions offers no comparable alternative to the Colorado River as a source of complete supplementary supply.

Possibly for Los Angeles this is a case where "beggars should not be choosers."

BACTERIOLOGICAL CONTENT

There remains to be considered the bacteriological content of the water. Few data exist as to the number of bacteria present. The Yuma water supply is taken from the river to be settled and filtered. Results of 13 examinations by the Arizona State Laboratory from 1925 to 1929 showed the raw water averaging 4,070 bacteria per c.c., with extremes of 400 to 19,000; and the settled water averaging 510 per c.c., with extremes of 45 to 2,200; bacterial efficiency of plain sedimentation thus averaged 87 per cent. The sewage of Blythe is treated in Imhoff tanks and on natural sand filters and does not enter the river; the sewage of Needles, after Imhoff tank treatment and chlorination, enters the river some 220 miles above Yuma, and the sewage of Yuma enters the river without treatment below the city and above the headworks of the Imperial Valley canal system. In the case of Yuma the sewage is said to be diluted 30,000 times.

A sanitary survey of Imperial Valley water supplies made by the California Department of Health in 1922 yielded the following results. In monthly examinations at Calipatria, Calexico, El Centro and Niland from 1916 to 1922—211 samples—total bacteria averaged 2,300 per c.c., *B. coli* 2.5 per c.c., bacterial efficiency of sedimentation 98.8 per cent. It was determined that nearly all the contamination settled out in the first 2 days and that the water was probably safe after 5 days. Settling could apparently be relied upon to remove the greatest part of the contamination. The filters at El Centro and Calexico removed some bacteria but reliance could not be placed upon them for substantial protection.

The Imperial Valley canal water appears to be grossly contaminated at all times evidently caused by contamination within the Valley. The Colorado River contamination at Yuma, shown by total bacteria and *B. coli,* must be largely due to drainage from grazing lands since the only sewage is greatly diluted and enters the river a long distance above. There can be no doubt as to the need of filtration and chlorination of all the Imperial Valley public water supplies. Of course, they will benefit by the dam through the reduction in the amount of silt load requiring removal and in the mixing of water during storage resulting in an averaging of chemical content.

The water supply for Los Angeles will be desilted during its long

storage in the reservoir, which will become an enormous plain sedimentation basin. Plain sedimentation is suitable as the only method of purification only when a water free from sewage contamination contains turbidity not colloidal in nature. In the case of the Colorado River the river traverses sparsely settled territory without contribution of sewage from any cities along its banks. Furthermore, the very nature of the country makes it improbable that there will be any development of population or industries. Whatever bacterial content the water may have will no doubt be largely removed by entanglement with the silt which settles out in the reservoir. Much greater danger of contamination would seem to exist in the terminal storage provided near the consumptive centers, which might naturally make chlorination desirable.

F. E. Weymouth, Chief Engineer of the Metropolitan Water Board, says:

> Water from the river is now in use in Yuma, various Imperial Valley municipalities and a number of irrigation projects. The water is believed to be entirely suitable for the uses of the Metropolitan Water District and better than the supplies of many cities. It is well within the requirements of the U. S. Public Health Service for potable water. Sewage pollution is not a factor on the Colorado and necessity for filtration or other special or expensive purification treatment is not anticipated.

W. D. Collins, chemist in charge of the Quality of Water Division, U. S. Geological Survey, writes:

> It is my feeling that there is comparatively little to worry about from the sanitary side as regards the utilization of water in a reservoir on the Colorado River. It seems likely that a filtration plant should be installed, possibly with some provision for softening. I would not feel sure that any reservoir would provide sufficiently clear water to be satisfactory, and I think few people now care to recommend the utilization of any surface water without some form of purification.

FUTURE SANITARY CONTROL

The construction of the dam will be carried out by the federal government because of the international and interstate character of the stream. The reservoir will be located on the boundary between Nevada and Arizona, and for the protection of the quality of water for domestic use it would seem reasonable that the U. S. Public Health Service should exercise sanitary control, in conjunction with the state boards of health. Coöperation of health protective agencies in control of the use of the river and reservoir may confidently be anticipated in order that the water supply of millions of people may be maintained in a condition of safety.

The Immigration Aspect

FRED T. FOARD, M. D.

Acting Assistant Surgeon, U. S. Public Health Service, in Charge Western Cöoperative Rural Sanitation, Stockton, Calif.

SOMEWHAT comparable in magnitude to the construction of the Panama Canal, the construction of Boulder Dam, whereby the world's greatest artificial lake will be formed, will be one of the largest engineering feats ever undertaken by the United States Government. We are told by the Department of the Interior that the time required to complete the task will be approximately 8 years, and the number of men employed at all times will be about 1,000. In addition to those actively engaged in construction work the families of employees and others drawn to the Boulder Dam townsite for business purposes will probably total a permanent population of approximately 5,000.

Located within easy reach of two transcontinental highways, one passing through northern Arizona and another through central Nevada, the Boulder Dam, with the widespread publicity given to it, will attract many thousands of tourists and employment seekers who will include it in their itinerary. It may be expected that a minimum of 25,000 to 30,000 people will visit the dam site each year.

At present no developments have been started, and as all lands along both sides of the Colorado River in the vicinity of future construction activities are owned by the federal government, the governmental agencies will be in a unique position as far as the approval of townsite plans, the termination of leases to those who may attempt to conduct non-legitimate business enterprises, etc., are concerned. Unlike conditions met with at similar large construction projects, it should be a comparatively easy matter to weed out the bootlegger, professional prostitutes, professional gamblers and other undesirables who are a detriment, from both a public health and economic standpoint, to the well-being of law abiding communities.

Climatic conditions in southern Nevada are considered to be altogether healthful. With the Boulder Dam, however, as the objective for many thousands of people, representing many nationalities and coming from all parts of this country as well as foreign countries, including Mexico and the Orient, it is certain that immigration problems will be met with which will require careful and continued public health supervision.

While no definite information could be obtained from the Secretary of the Interior as to the different nationalities which will be represented among the employees, I am grateful for information furnished through Dr. R. J. Stroud, Secretary of the Arizona State Department of Health, relative to nationalities employed in the construction of the Roosevelt and Coolidge dams in Arizona. Some information was also obtained from contractors who constructed several of the larger irrigation district and municipally owned dams in California. If the same policy of recruiting local labor is pursued at the Boulder Dam site as was carried out in the construction of smaller though similar projects in the Southwest, it can be expected that the proportions of nationalities represented will be about as follows: Mexicans 50 per cent, Indians 20 per cent, Filipinos not to exceed 2 per cent, and the remaining 28 per cent made up principally of Americans. There will in all probability be a few Chinese and a few Japanese who will be engaged in business enterprises of one kind or another.

Plans have already been drawn for the construction of the Boulder town on a permanent basis, with consideration given to proper ventilation and heating systems for all dormitories and other living quarters. A safe water supply and a sanitary method of sewage disposal have also been provided for, both of which will be built according to the specifications of experienced sanitary engineers.

DISEASE CONTROL

To obtain the best results in the prevention and control of disease will require close coöperation on the part of officials in charge of construction operations with federal, local and state public health and police officials. With the probability of many Mexican laborers, few of whom will have been vaccinated, considerable smallpox can be expected and some typhus may be met with. While vaccination cannot be made compulsory under the state laws of Nevada or Arizona except in time of a pending epidemic, a requirement on the part of employers for anti-smallpox vaccination for all non-immune applicants for employment would be a master stroke in the prevention of this disease, and may result in a great economic saving for employer and employee alike. Such a policy is now being carried out by the Southern Pacific Railway Company and has met with little opposition from trainmen and others affected by the ruling.

With the high prevalence and widespread distribution of epidemic cerebrospinal fever in the western states during the past few years it can be expected that some cases may be met with among the Boulder Dam population. Due to their high susceptibility and their tendency

to crowd together in close sleeping and living quarters, meningitis has been particularly prevalent among Filipinos in the Rocky Mountain and Pacific Coast states during the past two years. Should any considerable number of Filipinos be employed or become residents of the Boulder vicinity, careful and constant supervision of sleeping quarters will be necessary to prevent the spread of this disease.

Trachoma is very prevalent among the several tribes of Arizona Indians, many of whom will probably be employed as laborers by the construction companies. While these people will prefer to live in their tepee tent colonies away from other employees, constant vigilance will be necessary to prevent the spread of trachoma among school children. The Indian is also very susceptible to both measles and tuberculosis. For the control of these diseases and the general health of the Indians, as well as for the protection of those with whom the Indians will come in close contact, best results can be obtained through a public health nursing service. It would be preferable if an Indian nurse or one who has had previous experience with Indians could be employed for this duty. Careful sanitary supervision will also be necessary for Indian colonies in order that body excretions may be properly disposed of and the spread of typhoid and other intestinal diseases prevented.

Bacillary dysentery has been particularly prevalent in the Southwest during recent years. Hundreds of cases have been seen in the Salt River Valley in Arizona during the past three years, and it cannot be expected that the Boulder Dam district will completely escape this infection. In addition to the maintenance of a safe municipal water supply for the town and vicinity, careful and continued inspection and supervision of raw food supplies should be carried out. In view of the very hot weather in southern Nevada during the summer months, proper refrigeration facilities are essential and should be required for all food dispensaries.

MILK AND DAIRY PRODUCTS

In that neither southern Nevada nor northern Arizona is a milk producing area it is probable that the major portion of milk and milk products used at the Boulder Dam site will be provided from distant points, though some will be supplied from small dairies in the immediate vicinity. It will be necessary, therefore, that provision be made for the inspection and sanitary supervision of all dairies furnishing products to the people of the Boulder district. Unless such provision is made there will be constant danger of epidemics of diarrhea and enteritis, typhoid fever and other milk-borne infections.

Regardless of the degree of vigilance of the police and public health officials there will probably be a considerable venereal disease problem to be met. Although open prostitution may not be permitted, clandestine prostitution will be certain. For effective venereal disease control, continued and close coöperation between police and public health officials will be necessary. For the treatment of venereally infected patients a free treatment clinic should be maintained as a part of the routine program. An anti-venereal disease educational program should be carried on and should include the distribution of information through posters, pamphlets, lectures, the showing of moving picture films, etc. The literature distributed on the subject should be printed in as many languages as necessary.

IMMUNIZATION AND VACCINATION

It is probable that compulsory vaccination and immunization cannot be legally enforced in either Nevada or Arizona. If, however, the construction companies can be induced to require all employees to be vaccinated against smallpox and immunized against typhoid fever prior to or immediately after employment the control of these diseases will be greatly simplified and undoubtedly a great economic saving will be accomplished. Both anti-smallpox vaccination and anti-typhoid immunization, without cost for the service, should be offered to and urged upon all residents of the Boulder Dam area. Anti-diphtheria immunization should also be provided without cost for all children of preschool and school age.

Southern California county health officials and state and county health officials of Arizona advise that expenditures for the care of the indigent sick in the Southwest are a very heavy tax upon county and municipal appropriations for health purposes. In many instances funds appropriated for preventive measures are diverted for use in supplying food and medical care for indigents who have contracted preventable diseases, particularly smallpox and typhoid fever, in eastern or central western states or in Mexico, and have become ill while migrating to the Rocky Mountain or Pacific Coast states in search of employment, the restoration of health, or for other purposes. Certainly the indigent tourist is a considerable economic problem of many counties throughout the Southwest and every effort should be made by officials in charge to discourage prolonged visits of itinerants to the Boulder Dam site.

When the necessary personnel has been recruited widespread publicity should be given through the press that additional employees are not needed. Otherwise there will in all probability be a continuous

pilgrimage of wandering citizens headed for Boulder Dam during the period of construction. Most of these people will expect to live in tents by the roadside and at so-called automobile camps. Most of these camps are grossly insanitary, and constitute a serious public health problem. Typhoid fever, smallpox and other communicable diseases may be expected among these people and when they occur little can be done to control their spread.

HYGIENIC LABORATORY FACILITIES

The weekly bacteriological analysis of water and milk supplies, the examination for suspected diphtheria and tuberculosis cases, the diagnosis of venereal disease infections, and the routine running of Wassermann or Kahn tests, together with other necessary routine laboratory work, should justify the establishment of a hygienic laboratory at the site of construction. A single laboratory should be able to carry on all necessary work for the two counties adjacent, one in Arizona and one in Nevada.

ISOLATION AND HOSPITALIZATION

While hospital facilities are being provided for in the plans for the town which will be constructed for employees and their families, provision should also be made for the isolation and segregation of communicable diseases. An attempt to quarantine or isolate patients suffering with communicable diseases in dormitories, roadside tents or automobile camps, will be unsatisfactory and will constitute a serious health menace to the people of the local community and to those of nearby cities and towns and surrounding states.

OFFICIAL SUPERVISION

While the actual construction of the Boulder Dam will be carried on by private companies who will be under contract with the federal government, the dam itself and all the land in the immediate vicinity, including the townsite in which employees and their families will live, will be government owned property and under government supervision. For this reason it may properly be expected that the greater portion of the expense for maintaining health supervision should be borne by the federal government. Since this supervision will have to be carried out in accordance with the laws of Nevada and Arizona, however, a coöperative agreement should be arranged between federal, state, and local health officials whereby each may share in the responsibility of supplying an adequate and effective health service.

As surrounding communities will be directly affected by the prev-

alence or non-prevalence of preventable disease in the vicinity of the Boulder Dam during construction, and it will be an attraction for tourists for all time, it seems that public health supervision should be established on a permanent basis and organized to include the whole of the two adjacent counties, one in Arizona and the other in Nevada.

In order that health policies may be uniform it may be advisable for a single executive to be placed in charge of their formulation and the direction of public health activities. If legal technicalities should make it impossible for a single director to serve in two states, individual health officers for the respective counties could be appointed as assistants to the chief executive or director. The chief director and his assistant county health officers should, alike, be satisfactory to and approved by state health officials and local county officials.

While the above plan is merely suggested for consideration it is believed that through some such organization an efficient health service could be given, not only to those people in the immediate vicinity of construction activities, but to residents and transients alike on a county-wide basis. While it is impossible to estimate accurately at this time the cost of such a health service it is probable that efficient service could be given by a minimum health department personnel for the Nevada county, consisting of a county health officer, two experienced public health nurses, one sanitary inspector, a laboratory technician and an office clerk. For the Arizona county a minimum personnel to include a county health officer, one experienced public health nurse, and an office clerk would probably be sufficient.

In view of the limited normal populations in both of the counties concerned, and in that the greater portion of the time and work of the personnel of the respective county health departments would be given to the immediate vicinity of construction activities, it would be only reasonable to expect that the state and local governments should bear a minor portion of the expenses incurred for public health supervision. Provision, however, should be made looking toward the eventual taking over of the county health departments by the state and local governments. With the federal government providing for the salary of the director in charge, together with furnishing office space and equipment for the personnel of the two county health departments, it is probable that a well rounded public health program on a county-wide basis could be worked out whereby additional funds to provide for salaries and maintenance of field personnel could be borne in suitable proportions by county officials, the state departments of health, the Division of Rural Sanitation of the U. S. Public Health Service, and possibly to some extent by coöperation from the Rockefeller Foundation or other private agencies engaged in public health work.

Problems of Sanitation at Headquarters Area During Construction of Boulder Dam

H. B. HOMMON, F. A. P. H. A.

Sanitary Engineer, U. S. Public Health Service, San Francisco, Calif.

THE Boulder Canyon project act (45 Stat., 1057) approved by the President, December 21, 1928, authorized, subject to future appropriations, the construction of a reservoir of not less than 20,000,000 acre-feet capacity on the Colorado River, the dam to be located at either Black Canyon or Boulder Canyon. It has been decided to locate the dam in Black Canyon (see map), approximately 20 miles downstream from Boulder Canyon. This location is about 30 miles southeast of Las Vegas, Nev., and 65 miles northwest of Chloride, Ariz., shipping points, respectively, on the Union Pacific and Santa Fe Railroads. The river at this point is the boundary line between Arizona and Nevada.

The situation with regard to the construction work at this time is explained in the following quotation from Dr. Elwood Mead, Commissioner of Bureau of Reclamation Service:

> Plans for the town are awaiting an appropriation of funds by Congress with which to begin construction work. At the present time, therefore, there is very little information available, as the town site has not even been laid out.

The Act of December 21, 1928, authorizes an appropriation of $165,000,000 to carry out all the work contemplated, and Congress has been requested to make available immediately $10,660,000 to build a town and provide the necessary utilities; to build railroads and highways; provide necessary equipment; and start preliminary work on the diversion tunnels.*

In order to obtain a proper perspective regarding the size of the Boulder Dam project and the magnitude of the problems of public health confronting the United States Government and the states of Nevada and Arizona, there will be given a few facts from official papers of the Reclamation Service. The dam will raise the present water surface 550 feet and the structure will have a total height of about 700 feet. The reservoir behind the dam when filled will be

* About June 15 $10,660,000 was appropriated for this work.

approximately 110 miles long, and the amount of water stored will be sufficient to cover the state of Kentucky one foot deep. This will be the largest artificial body of water in the world.

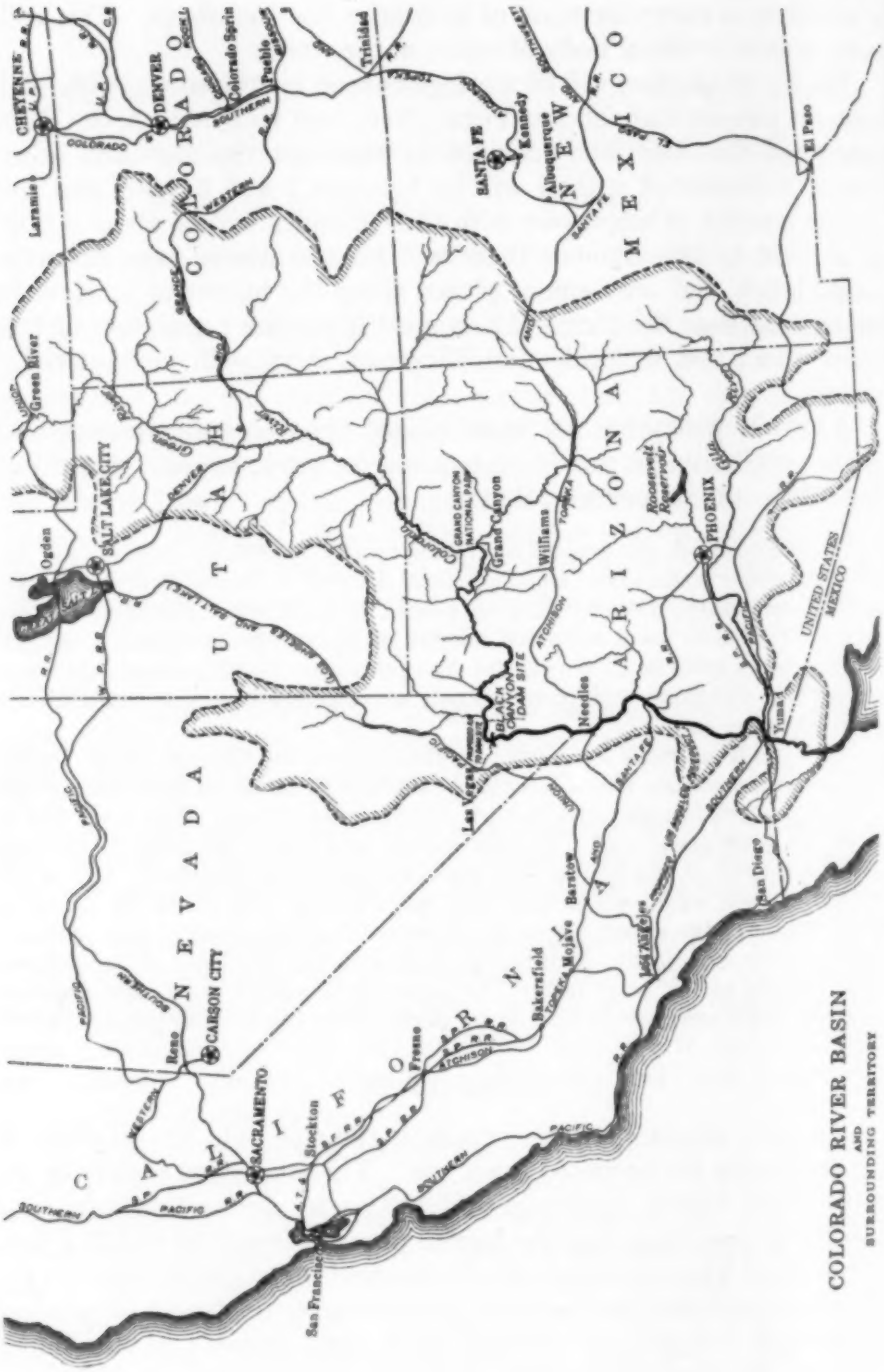
The top of the dam will be a bridge connecting the transcontinental highways passing through Las Vegas, Nev., and Kingman, Ariz. It is anticipated that the time required to construct the dam and other structures connected with it will be between 7 and 8 years and the average number of employees with their families will be about 4,000. In addition to this number there will be a scattered population in camps, hotels and amusement places along the highways in Nevada and Arizona near the dam site and most likely the population of Las Vegas, Nev., and Chloride and Kingman, Ariz., will be materially increased.

A definite policy has not been decided upon regarding concessions and responsibility for providing housing for workmen and their families. It is stated, however, that:

> On contract work the general contractor usually supervises, controls, and operates the major concessions, especially those located in the construction camps, such as commissary, dormitories, mess houses, hospital, etc. Should it be considered advisable to grant a limited number of concessions to others, a suitable area may be set aside in a town site for such purposes. Under present regulations it is customary to grant such privileges only under competitive bids received after public advertisement.
>
> Plans are being made for a town on the brink of the Colorado River for the housing of the workmen who will construct Boulder Dam, and of their families and the normal population necessary to their comfortable existence. The town will be located on government land. The government will retain ownership of the land and lease it to those who live on it or use it for commercial purposes. One of the features of these leases will be that they will continue only under the period of good behavior of the tenant. It is the intention of the government that the bootlegger or other law violator shall not interfere with the well-being of its workmen while assigned to this huge task. The power to terminate leases, and therefore residence, in this town will be used as one of the means of enforcing proper conduct.

WATER SUPPLY

The only source of water supply is the Colorado River, which is 800 feet below the proposed town site. The suspended matter in the water varies from a maximum of 4,400 p.p.m. during flood stages to 300 during low water, and the hardness varies from 150 to 530 p.p.m. The town of Yuma, located several hundred miles downstream on the river, uses the water for domestic purposes after treatment by settling, coagulation and passage through rapid sand filters. Above Yuma, however, the river passes through low land where considerable sediment is deposited and the problem of removing sediment at the dam


CHEYENNE
DENVER
COLORADO
Colorado Springs
Pueblo
Trinidad
Laramie
Green River
SALT LAKE CITY
Ogden
SANTA FE
Kennedy
Albuquerque
El Paso
NEW MEXICO
COLORADO
UTAH
GRAND CANYON NATIONAL PARK
Grand Canyon
Williams
Roosevelt Reservoir
PHOENIX
ARIZONA
UNITED STATES
MEXICO
BLACK CANYON DAM SITE
Needles
Yuma
Las Vegas
San Diego
Barstow
Bakersfield
Fresno
Stockton
SACRAMENTO
CARSON CITY
Reno
San Francisco
NEVADA
CALIFORNIA
COLORADO RIVER BASIN
AND
SURROUNDING TERRITORY

site will be more difficult than at Yuma. The government has for several years been making turbidity and other analyses of water taken from the river in the Canyon above the site of Boulder Dam and the data available will be valuable in designing a water treatment plant. It has been estimated that the initial developments will cost approximately $100,000. This, however, does not include force mains and distribution system and storage tanks.

Outside of the area set aside for the town site, there will be located on privately owned or leased land, stores, hotels, camps and amusement places, all of which will have to be supplied with water hauled in tank cars or furnished by the government. Since many of the laborers who will be employed at the dam may live a part or all of their time outside of the town, and since the employees at the dam will mingle with the people living outside the government area, an adequate and pure water supply should be provided not only for the town but for all places that are built up outside and are operated in connection with the work at the dam. This brings up a rather complicated problem of public health since it involves the authorities of the government and the states of Arizona and Nevada.

SEWAGE DISPOSAL

No plans or estimates have been made by the government for a sewerage system or treatment plant and no contour map of the area where the new town will be located is available. The country is hilly, arid, sparsely settled, and the only towns diverting water from the Colorado River for domestic purposes are Needles, about 100 miles downstream, Yuma, approximately 250 miles, and El Centro, which takes water from an irrigation canal beyond Yuma. The large dilution factor in the river water together with the long distance before water is diverted for domestic purposes will permit the discharge of partially treated and disinfected sewage into the river, and the nature of the topography of the land and climatic conditions may be favorable for broad irrigation.

The Reclamation Service can locate the town site with a full knowledge of the responsibility for providing water and taking care of sewage for a fairly definite number of people located in one place; but outside and nearby the town site there may develop a serious public health problem in providing adequate sewage disposal for the people attracted to the dam either as prospective laborers or as operators providing services or amusements. With the present labor conditions throughout the country, workmen from every state and from Mexico may go to Boulder Dam in large numbers, and the only places they

can live outside of the new town will be in camps or hotels established along the highways. If it is not practicable for the government to furnish water under pressure to the communities that develop on both sides of the river and beyond the government areas, it will be necessary for the state or county officials of the two states concerned to require installation of either chemical toilets or can privy systems with organizations to take care of them properly, or earth pit privies properly designed.

GARBAGE DISPOSAL

The problem of collecting and disposing of garbage and rubbish from the new town and construction camps will be similar to permanent towns of the same size and general location. Although isolated areas are available for disposing of garbage, refuse and tin cans, it is believed that it will be more economical and practical to burn the garbage and bale the tin cans. An incinerator and baling machine of the type used by the National Park Service in the National Parks would be satisfactory for the population anticipated in the new town.

Outside the area under the jurisdiction of the Reclamation Service, there will develop along the highways a problem of collecting and disposing of garbage and refuse from tourist camps, hotels and other places. This problem, however, will no doubt be handled in accordance with some general plan that will be adopted for supervision over sanitation in all the territory adjacent to the dam site.

INSECT CONTROL

Malaria exists in southern Nevada and in Arizona and it will be carried to the dam and neighboring territory by employees and tourists. It will be necessary, therefore, at the new town to prevent the breeding of mosquitoes by covering and screening storage reservoirs and to eliminate or oil all vessels of any kind or catch basins that will hold water, and to design and operate the sewage treatment plant so that mosquitoes cannot breed in the sewage. In order to control malaria at the dam, however, it will be necessary to prevent breeding of mosquitoes in the areas in Arizona and Nevada adjacent to the dam as well as the territory immediately around the dam.

The extent of a fly nuisance or menace to health will depend upon the efficiency of the organization and equipment for removing at regular intervals garbage, refuse, stable manure, and the construction of earth pit toilets so that flies cannot enter them.

It is not only possible but practicable to reduce the breeding places of mosquitoes and flies to a minimum and to screen houses to prevent

the entrance of these insects. It would appear, therefore, that the only problem involved in this matter is an organization to handle the work and the coöperation of the three different authorities having jurisdiction.

FOOD SUPPLIES

There will be constructed a branch railroad line from the Union Pacific System at Las Vegas to the new town at the dam on the west side of the river and possibly another branch from Chloride on the Santa Fe lines to the east side. This will insure delivery of food supplies in proper condition directly to the dam. The main problem, therefore, in connection with the food supplies in relation to public health will be the handling of the food after delivery. Since the temperature at the dam site varies from a minimum of 20° F. to a maximum of 120° F., it will be necessary to provide adequate refrigeration for perishable foods and to inspect at regular intervals all places storing, handling and serving food products.

CONCLUSIONS

The Reclamation Service has constructed large dams in the Southwest and is familiar with the problems of public health that develop in a large population gathered together from different sections of the country in a new town or camps. The situation at Boulder Dam, however, differs from the construction at other dams, because of the size of this project and the location on the boundary line of two states. As already stated, there will be approximately 4,000 people living at the headquarters area and other places on government owned land, and in addition there may be a large number of people living outside the government areas but adjacent to them in Arizona and Nevada. All of these people will form one large community, but authority over public health will be divided between the officials of the government and the states of Arizona and Nevada. It would appear, therefore, that it will be necessary to establish efficient health organizations in the counties of Arizona and Nevada bordering on the area around the dam, and for the health officials of these two counties and the government to work in close coöperation. If appropriations cannot be obtained in the states for carrying on the necessary health work, the government should either provide the necessary funds or work out a plan with the health officials of these two states whereby the Reclamation Service would accept the responsibility for sanitation and other matters pertaining to public health in a limited zone around the headquarters area.

DISCUSSION

R. J. STROUD, M. D.

Health Officer, Phoenix, Ariz.

DR. FOARD asked me to say a word about Indians. In Arizona projects—and there have been five major ones, four in Salt River and one on the Gila River—we have employed an average of 22 per cent Indians. Whether in a project as large as this there will be that many Indians, we do not know, but if there should be, we will have quite a problem.

There are several kinds of Indians. The good fighters are the good workers. The Apache is a wonderful worker. Contractors in that section like to have the Apache Indians as laborers. They have never built permanent places for they are not farming people as are the Pimas, Maricopas, and others. They want to go out and work, but insist upon one thing, and that is that they live by themselves in their own communities. During all of our constructions, the Indians were given home sites in a little canyon where they could be by themselves.

Indians and Mexicans get along very peaceably with the flies. They do not make any attempt to kill them, but seem to feel that they are just a part of their daily bread. If the Indians are restricted in any way, they will simply move just outside of the government franchise, for they will live their own lives. While they like work, they believe in the women doing the work at home. The smoke curls through the ceiling of their tepees, and they chop their wood long and burn the end only, the other end protruding outside. Where this little piece of wood passes in there is going to be a fly menace—an opening where flies can go through.

The next problem is the Indian child. Primitive races have tuberculosis young. They do not die at 18 to 25 years of age, but from 6 to 14. At least 25 per cent of these children can be proved tuberculous by the stethoscope. Because it is natural for children to fraternize, these children will mix with other children, especially if they are put into the same schools.

While the Indians will tolerate inoculation, they will not stand for segregation. There are some things you cannot do with an Indian, and this is one of them. If you try to pin a measles sign on his door, he will just move right out. This is a problem you will have—spreading tuberculosis, trachoma, and venereal diseases among his own people, and then going out and mixing among the other people under a very loose control.

LEON B. REYNOLDS

MOST of those who have felt that the increase in salt content would be inappreciable have based their conclusions partially on the slow solution of salt in the salt cliffs, partially on the feeling that the silt content of the water itself would settle out and cover up those beds with a blanket, or silt cover, which would prevent further solution, and partially on the belief that the silt cover which is on top of those cliffs would prevent further solution. As far as the silt blanket is concerned, it seems to me that the silt coming from the Colorado itself will naturally be deposited as soon as the water is stilled, which would be up at the upper end of the 90- or 100-mile reservoir, and that probably only small portions

of it would continue down as far as the point where the Virgin River empties, probably fifty or sixty miles from the upper end of the reservoir. For that silt to continue in the water down as far as the entrance of the Virgin River seems to me rather unlikely. On the other hand, silt from the Virgin River might be useful in providing a silt bed on those salt cliffs. I am not very familiar with the characteristics of the Virgin River as to whether it carries sufficient silt to accomplish that or not.

The engineers who have studied the proposition have decided that the best location for the dam, all things considered, is at the Black Canyon, at least for the first development, that it would be more useful due to being nearer the center of power distribution, and better for de-silting of the river at that location than at the Bridge Canyon site.

RESOLUTION NO. V

Adopted by the Western Branch of the American Public Health Association, June 14, 1930

WHEREAS, the construction of the Boulder Dam will present inter-state health and sanitary problems involving the United States Government and two sovereign states; and

WHEREAS, certain contracts may be let to private contractors for construction of various units of the dam; and

WHEREAS, the health and sanitary problems developing will directly or indirectly affect the local population as well as that in the surrounding states, now therefore be it

RESOLVED, that it is the sense of the Western Branch of the American Public Health Association, now in session in Salt Lake City, that the importance of these problems which will develop be given careful study by the Secretary of the Interior, the Surgeon General of the U. S. Public Health Service, and the State Health Departments of Arizona and Nevada, with the view to consolidating their efforts into a uniform plan of procedure; and be it further

RESOLVED, that it is recommended that such coördinated activities be agreed upon in advance of construction work.

Milk-Borne Disease in Massachusetts, 1927-1929*

GEORGE H. BIGELOW, M. D., F. A. P. H. A., AND
FILIP C. FORSBECK, M. D.

Commissioner, Massachusetts Department of Public Health; and Research Fellow, Harvard School of Public Health, Boston, Mass.

PREVIOUS chronological reports of milk-borne disease in Massachusetts[1, 2, 3, 4] have been published covering periods of from three to eight years. During the past three years the menace of inadequately protected milk supplies has been more forcibly brought to attention than ever before, particularly because of an outbreak of septic sore throat resulting in 48 deaths.[5, 6, 7, 8] Moreover, progress in the protection of milk supplies has been more rapid in Massachusetts than ever before. It is thought desirable, therefore, to bring previous data up to date at this time, and to increase the number of items studied. Certainly it is utterly futile to carry on an intelligent program among laymen, producers, dealers, and boards of health, without being able to present the facts about the current milk situation. Many groups rightfully expect the State Department of Public Health to be a clearing house for this type of statistical information.

Questionnaires covering the year 1928 were sent to the 125 Massachusetts cities and towns of over 5,000 population, which represent over 90 per cent of the entire population of the state. Replies were received from 95 communities, 76 per cent of all those receiving the questionnaires. These communities represent 83 per cent of the total population of the state. In previous reports only communities of over 10,000 population were studied. We have found that the towns in the 5,000–10,000 group have, as a whole, been unable to supply satisfactory information relative to the milk situation in their respective towns. It is our opinion that most progress is needed in this group at the present time. The group has a population of about 400,000, and yet has a milk supply which, in general, is very poorly protected.

Table I gives information relative to the towns answering the questionnaire.

In Table II are listed the total reported cases of certain diseases by years, the number, and the percentage traced to milk. There is

* Fifth Chronological Report from the Massachusetts Department of Public Health.

TABLE I

INFORMATION RELATIVE TO COMMUNITIES ANSWERING QUESTIONNAIRE

Group[a]	Communities in Group	No. of Communities Answering Questionnaire	% Answering Questionnaire	Pop. of Group Answering Questionnaire[b]
50,000 and over (I)	17	17	100.0	2,342,242
25,000–50,000 (II)	13	11	84.7	436,002
15,000–25,000 (III)	25	22	88.0	414,593
10,000–15,000 (IV)	19	15	78.9	184,715
5,000–10,000 (V)	51	30	58.8	226,701
Totals	125	95	76.0[c]	3,604,253

[a] In subsequent tables the population groups will be designated by Roman numerals.
[b] Estimated 1928 population of state—4,324,873.
[c] Means in this and all subsequent tables are weighted.

undoubtedly considerable error in this set of figures. For example: Septic sore throat was not made reportable until 1914; morbidity reporting is far from perfect, and varies in its accuracy with different diseases; it is frequently impossible to state the exact number of cases due to milk-borne disease; and finally, small obscure outbreaks might be missed entirely.

Nevertheless, there are several interesting trends which are worth noting. Since 1906 there has been a decrease of milk-borne disease at the rate of about 12 per cent per year, if the Lee outbreak is not included, and at the rate of about 5 per cent if it is included. The percentage of diphtheria and of septic sore throat traced to milk has remained fairly constant, although in the latter case the period is too short to be of much value statistically. During the period 1906–1929, the percentage of scarlet fever traced to milk decreased at the rate of about 15 per cent per year, while during the period 1896–1929 the percentage of typhoid fever cases traced to milk increased at the rate of about 5 per cent per year.

This difference in typhoid fever and scarlet fever trends may be logically accounted for in this way: Typhoid fever is being dealt with so successfully in other ways that, in spite of the increasing amount of pasteurized milk, the disease is finding milk to be more and more its stronghold as compared with water, for example. In the case of scarlet fever, however, efforts up to the last two or three years have been almost futile, probably the only real advance being the protection offered by the increased use of pasteurized milk. Hence the decline in the percentage of cases traced to milk.

Table III shows the seasonal distribution of milk-borne disease by cases and outbreaks over a period of 44 years. The curve is bimodal, the first and minor peak occurring in April because of the prevalence of septic sore throat and scarlet fever outbreaks, and the second and major peak in August and September because of the prevalence of typhoid fever outbreaks. In each of the four diseases studied, about

TABLE II

PROPORTION OF CASES OF TYPHOID FEVER, SEPTIC SORE THROAT, SCARLET FEVER AND DIPHTHERIA TRACED TO MILK, 1896–1929

	Typhoid Fever			*Septic Sore Throat*			*Scarlet Fever*			*Diphtheria*			*Totals*				
	Cases[d]	Milk[e]	%[f]	Cases	Milk	%	Cases	Milk	%	Cases	Milk	%	Cases	Yearly Mean	Milk	Yearly Mean	Per Cent
1896–1900	12,680	266	2.1	0	0	—	24,708	0	0.0	39,883	42	0.1	77,271	15,454	308	62	0.4
1901–1905	14,036	264	1.9	0	0	—	23,059	146	0.6	36,270	0	0.0	73,365	14,673	410	82	0.6
1906–1910	15,207	1,226	8.1	0[b]	(200)	—	36,254	1,364	3.8	41,467	88	0.2	92,928	18,585	2,678[a]	536	2.9
1911–1915	11,261	600	5.3	(865)[b]	(3,156)	—	39,538	462	1.2	36,534	36	0.1	87,333	17,467	1,098[a]	220	1.3
1916–1920	6,001	417	6.9	905	683	75.5	34,992	140	0.4	39,968	47	0.1	81,866	16,373	1,287	257	1.6
1921–1925	3,390	228	6.7	746	75	10.1	53,228	109	0.2	38,716	32	0.1	96,080	19,216	444	89	0.5
1926–1929	1,635	135	8.3	1,772[c]	1,034	58.3	48,314	157	0.3	16,459	0	0.0	68,175	17,043	1,326	331	2.1
Totals	64,209	3,136	4.9	3,423	1,792	52.3	260,093	2,378	0.9	249,297	245	0.1	577,018	16,971	7,551	222	1.3

[a] Total does not include septic sore throat.
[b] Septic sore throat made reportable September, 1914.
[c] Includes 660 cases in the Lee outbreak and 71 in the Charlton outbreak not officially reported.
[d] Cases reported during period.
[e] Cases traced to milk.
[f] Percentage of reported cases traced to milk.

TABLE III

SEASONAL DISTRIBUTION OF CERTAIN MILK-BORNE DISEASES BY CASES AND OUTBREAKS, 1886–1929

Disease	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*	*Unknown*	*Total*
Typhoid Fever														
Outbreaks	5	2	8	3	4	3	15	26	27	10	8	6	5	122
Cases	211	11	566	101	154	22	331	910	596	143	174	154	37	3,410
Cases per Outbreak	42	5	71	33	38	7	22	31	22	14	22	26	7	27.9
Septic Sore Throat														
Outbreaks	2	2	0	5	4	4	2	0	0	1	0	0	0	20
Cases	67	1,125	0	1,185	1,443	1,142	179	0	0	7	0	0	0	5,148
Cases per Outbreak	33	562	0	237	361	285	89	0	0	7	0	0	0	257.0
Scarlet Fever														
Outbreaks	5	2	4	5	3	0	2	1	1	0	0	3	0	26
Cases	696	12	199	885	18	0	75	14	400	0	0	83	0	2,382
Cases per Outbreak	139	6	50	177	6	0	37	14	400	0	0	28	0	91.7
Diphtheria														
Outbreaks	0	1	0	3	1	1	0	1	3	0	1	0	1	12
Cases	0	30	0	104	9	50	0	33	41	0	16	0	12	295
Cases per Outbreak	0	30	0	34	9	50	0	33	14	0	16	0	12	24.6
Totals														
Outbreaks	12	7	12	16	12	8	19	28	31	11	9	9	6	180
Cases	974	1,178	765	2,275	1,624	1,214	585	957	1,037	150	190	237	49	11,235
Cases per Outbreak	81	168	6	142	134	152	31	34	33	14	21	26	8	62.4

80 per cent of the outbreaks occur in one-half of the year. This period is blocked-off in Table III and is summarized in Table IV. It is interesting to note that scarlet fever and septic sore throat, which have so many common characteristics, are alike in the seasonal distribution of milk-borne outbreaks. This fact has been noted by Scamman for the state as a whole.[9] We have no explanation for the fact that the milk-borne outbreaks of diphtheria tend to occur at the opposite time of the year to the general incidence.

In the case of typhoid fever, the seasonal distribution of milk-borne outbreaks cannot entirely be accounted for on the basis of an increase of general incidence. Many of the outbreaks are due to carriers, and their number may be presumed to have no seasonal variation. Table V contains information relative to typhoid fever outbreaks caused by cases and by carriers. It shows that outbreaks due to carriers have a seasonal distribution similar to the typhoid fever curve of general incidence. The seasonal increase is probably due to one or more of the following factors:

1. Increased vulnerability of the milk
2. Increased output of *B. typhosus*
3. Increased virulence of the organism
4. Increased susceptibility of the individual

Vulnerability of the milk supply is certainly a minor factor if it plays any rôle, since the peak is not coincidental with the heat peak. To study the bacterial output of carriers by seasons would give information which might throw considerable light on the epidemiology of typhoid fever.

As a matter of fact, the median outbreak due to a carrier occurs about two weeks before the median outbreak caused by a case. The

TABLE IV

CASES, OUTBREAKS, AND CASES PER OUTBREAK IN EPIDEMIC AND NON-EPIDEMIC HALF YEARS

Disease	*Epidemic Half Year*	*Outbreaks*			
		Epidemic ½ yr.		*Non-Epidemic ½ yr.*	
		No.	*%*	*No.*	*%*
Typhoid Fever	July–Dec.	92	78.6	25	21.4
Septic Sore Throat	Jan.–June	17	85.0	3	15.0
Scarlet Fever	Dec.–May	22	84.6	4	15.4
Diphtheria	Apr.–Sept.	9	81.7	2	18.3
Totals		140	80.5	34	19.5

Disease	*Epidemic Half Year*	*Cases*				*Cases Per Outbreak*	
		Epidemic ½ yr.		*Non-Epidemic ½ yr.*		*Epidemic ½ yr.*	*Non-Epidemic ½ yr.*
		No.	*%*	*No.*	*%*	*No.*	*No.*
Typhoid Fever	July–Dec.	2,308	68.5	1,065	31.5	25.1	42.6
Septic Sore Throat	Jan.–June	4,962	96.2	186	3.8	292.0	62.0
Scarlet Fever	Dec.–May	1,893	79.4	489	20.6	86.0	122.2
Diphtheria	Apr.–Sept.	237	83.7	46	16.3	26.1	23.0
Totals		9,400	84.2	1,786	15.8	67.1	52.5

TABLE V

SEASONAL DISTRIBUTION OF TYPHOID FEVER OUTBREAKS BY MODE OF INFECTION

	Jan.	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*	*Total*
Case	1	1	1	1	2	0	5	4	8	4	1	1	29
Carrier	1	1	2	3	0	3	4	8	5	3	2	2	34

TABLE VI

THE RELATIVE NUMBER OF MILK-BORNE OUTBREAKS OF TYPHOID FEVER DUE TO CASES AND CARRIERS

	Cases		*Carriers*	
	No.	*%*	*No.*	*%*
First 16 outbreaks	11	69	5	31
Second 16 outbreaks	10	63	6	37
Third 16 outbreaks	7	44	9	56
Fourth 16 outbreaks	3	19	13	81
	31	48	33	52

only explanation we can offer is that of recent years there have been more outbreaks due to carriers, and the more recent outbreaks have been occurring earlier coincidentally with an earlier seasonal distribution. The possibility of such changes has been noted by Rosenau[10] and by Mills.[11]

The recent increase in the relative number of outbreaks known to be caused by carriers is illustrated in Table VI. The explanation is two-fold: Only in recent years have we become actively cognizant of carriers, and each year greater effort is made to find them. The number of carriers is not decreasing so rapidly as the number of cases.

In Tables VII and VIII are shown the relative frequency of cases and outbreaks, respectively, of the four diseases considered. These tables show that, of milk-borne disease in Massachusetts, there are more outbreaks of typhoid fever, but more cases of septic sore throat. If just the past twenty years are considered, septic sore throat is still more relatively important.

Since 1911, outbreaks and cases have been decreasing at the rate of about 10 per cent per year, if the Lee outbreak is included; while cases have been decreasing at the rate of about 16 per cent per year, if the Lee outbreak is excluded. In other words, outbreaks are becoming limited to smaller dealers as time goes on, largely because of the fact that pasteurization is being more fully utilized by the larger dealers. The dilution incident to the larger supplies may also be a factor. In a period of about twenty years, the case rate of milk-borne disease has been about 41 per cent higher in communities under 10,000 population than in communities over 10.000. This reflects the high percentage of protection offered by pasteurized milk in the larger communities.

TABLE VII

TABLE VII

PERCENTAGE DISTRIBUTION OF MILK-BORNE DISEASE BY CASES

	Typhoid Fever			*Septic Sore Throat*			*Scarlet Fever*			*Diphtheria*			*Total*		
	Cases	Mean	%[a]	Cases	Mean	%	Cases	Mean	%	Cases	Mean	%	Cases	Mean	%
1886–1890	50	10.0	48.1	0	0.0	0.0	4	0.8	3.8	50	10.0	48.1	104	20.8	100.0
1891–1895	224	44.8	100.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	224	44.8	—
1896–1900	266	53.2	86.4	0	0.0	0.0	0	0.0	0.0	42	8.4	13.6	308	61.6	100.0
1901–1905	264	52.8	64.4	0	0.0	0.0	146	29.2	35.6	0	0.0	0.0	410	82.0	100.0
1906–1910	1,226	245.2	42.6	200	40.0	6.9	1,364	272.8	47.4	88	17.6	3.1	2,878	575.6	100.0
1911–1915	600	120.0	14.1	3,156	631.2	74.2	462	92.4	10.9	36	7.2	0.8	4,254	850.8	100.0
1916–1920	417	83.4	32.4	683	136.6	53.1	140	28.0	10.9	47	9.4	3.6	1,287	257.4	100.0
1921–1925	228	45.6	51.4	75	15.0	16.9	109	21.8	24.5	32	6.4	7.2	444	88.8	100.0
1926–1929	135	33.8	10.2	1,034	258.5	78.0	157	39.2	11.8	0	0.0	0.0	1,326	331.5	100.0
Total	3,410	77.5	30.3	5,148	117.0	45.8	2,382	54.1	21.2	295	6.17	2.6	11,235	255.3	100.0

[a] Per cent of total milk-borne disease

TABLE VIII

PERCENTAGE DISTRIBUTION OF MILK-BORNE DISEASE BY OUTBREAKS

	Typhoid Fever			*Septic Sore Throat*			*Scarlet Fever*			*Diphtheria*			*Total*		
	Outbreaks	Mean	%	Outbreaks	Mean	%	Outbreaks	Mean	%	Outbreaks	Mean	%	Outbreaks	Mean	%
1886–1890	1	0.2	33.3	0	0.0	0.0	1	0.2	33.3	1	0.2	33.3	3	0.6	100.0
1891–1895	5	1.0	83.3	0	0.0	0.0	0	0.0	0.0	1	0.2	16.7	6	1.2	100.0
1896–1900	13	2.6	86.7	0	0.0	0.0	0	0.0	0.0	2	0.4	13.3	15	3.0	100.0
1901–1905	17	3.4	77.3	0	0.0	0.0	5	1.0	22.7	0	0.0	0.0	22	4.4	100.0
1906–1910	21	4.2	72.4	1	0.2	3.4	5	1.0	17.3	2	0.4	6.9	29	5.8	100.0
1911–1915	30	6.0	65.2	8	1.6	17.4	6	1.2	13.0	2	0.4	4.4	46	9.2	100.0
1916–1920	19	3.8	59.4	7	1.4	21.9	4	0.8	12.5	2	0.4	6.2	32	6.4	100.0
1921–1925	11	2.2	64.6	2	0.4	11.8	2	0.4	11.8	2	0.4	11.8	17	3.4	100.0
1926–1929	5	1.3	50.0	2	0.5	20.0	3	0.8	30.0	0	0.0	0.0	10	2.5	100.0
Total	122	2.8	67.8	20	0.5	11.1	26	0.6	14.4	12	0.3	6.7	180	4.1	100.0

TABLE IX

CHRONOLOGICAL CHANGE IN SIZE OF MEAN AND MEDIAN OUTBREAK

Quinquennium	*Outbreaks*[a]	*Cases*	*Cases per Outbreak*	*Median Outbreak* *Inc. Typhoid Fever, Diphtheria, Scarlet Fever, and Septic Sore Throat*	*Median Outbreak* *Inc. Typhoid Fever, Diphtheria, and Scarlet Fever*
1886–1890	3	104	35	50	50
1891–1895	4	224	56	40	40
1896–1900	15	308	21	17	17
1901–1905	20	410	21	17	17
1906–1910	28	2,878	103	36	33
1911–1915	45	4,255	95	18	12
1916–1920	32	1,287	40	16	9
1921–1925	17	444	26	11	11
1926–1929	10	1,326	133	29	22

[a] Including only those outbreaks for which the number of cases is known more or less accurately.

In Table IX are listed those outbreaks for which the number of cases are fairly definitely known. From this table we have calculated the mean number of cases and outbreaks by quinquenniums. The average number of cases per outbreak has been increasing at the rate of about 1.6 per cent per year. This increase in the mean number of cases per outbreak is due entirely to the tremendous outbreaks of septic sore throat in recent years. As a matter of fact, the median outbreak is decreasing as would be expected when one considers that the larger milk dealers take up pasteurization with greater readiness than the smaller ones. If one includes the septic sore throat outbreaks, the size of the median outbreak since 1886 has been decreasing at the rate of 1.8 per cent per year; while if septic sore throat is not included, the size of the median outbreak has been decreasing at the rate of 3.3 per cent per year.

TABLE X

LIST OF OUTBREAKS TRACED TO MILK
1927–1928–1929

Year	*Month*	*Place*	*Disease*	*Cases*	*Deaths*	*Source*	*Milk Pasteurized or Raw*
1927	Mar.	Billerica	Typhoid Fever	23	1	Carrier (Milk Farm)	Raw
1928	June–July	Lee	Septic Sore Throat	950	48	Cow (possibly infected by case)	Raw
1928	July	Pembroke-Marshfield	Scarlet Fever	15	0	Case (?)	Raw
1928	July–Aug.	Medway	Typhoid Fever	5	0	Unknown	Raw
1928	Aug.	Littleton	"Gastrointestinal"	20	0	Unknown	Raw
1928	Aug.–Sept.	Worcester	Dysentery	126	17	Carrier	Pasteurized[a]
1929	Mar.	Framingham	Scarlet Fever	15	0	Case (?)	Raw
1929	Mar.	Plymouth	Scarlet Fever	127	0	Case (?)	Raw
1929	June	Charlton	Septic Sore Throat	84	2	Case	Raw

[a] Milk placed in 20- and 40-quart cans after pasteurization and infected by a carrier who as a food handler transferred the milk from the cans to the cups of patients in an institution for mental disease.
NOTE: Some cases never officially reported, but found by special investigation.

Table X lists the outbreaks traced to milk in 1927, 1928, and 1929. Nineteen twenty-nine is the first year since the first outbreak of typhoid fever was reported, in 1886, that has not witnessed an outbreak of milk-borne typhoid fever. There has been no outbreak of milk-borne diphtheria for four years.

Table XI shows the per capita consumption of milk. No significant change in this is noted, although the value of milk as a food is being urged in the schools and elsewhere. It will be seen that the reported per capita consumption is greater in the larger communities. It is not known whether the per capita consumption is greater in rural or urban communities. Undoubtedly the figures are greatly influenced by the fact that home consumption of home production is not included in the milk statistics of boards of health. The per capita milk consumption is an important measuring stick from both commercial and health points of view, and we are convinced that the

TABLE XI

THE PER CAPITA CONSUMPTION OF MILK

Group	No. of Communities Answering Item		Quarts Sold Daily	Quarts Per Capita
		1919		
Towns of all sizes	?		1,350,000	0.56
		1923		
I	12		836,937	0.46
II	10		212,164	0.50
III	10		79,877	0.38
IV	9		42,768	0.38
	41		1,171,746	0.46
		1926		
I	15		1,145,834	0.52
II	10		217,435	0.50
III	12		83,684	0.36
IV	6		35,406	0.43
	43		1,482,359	0.50
		1928		
I	17		1,096,399	0.47
II	11		192,757	0.44
III	20		154,855	0.41
IV	14		61,769	0.36
Subtotals	62		1,505,780	0.45
V	26		75,166	0.38
Totals	88		1,580,946	0.45

questionnaire is not accurate enough to be satisfactory for this purpose. The U. S. Department of Agriculture, working in collaboration with the State Departments of Agriculture, of Conservation, and of Health, are planning periodic surveys which will give this information with greater accuracy.

The milk consumed in Massachusetts is produced in the New England States, New York, and Quebec. It is estimated that 62.4 per cent of the milk consumed in the communities answering this item of the questionnaire is produced in Massachusetts.

As one would expect, the percentage of home production increases quite uniformly with the decrease in the size of the community. Thus, in communities of over 50,000 about 40 per cent of the milk is imported from other states, while in the communities of 5,000 to 10,000 about 14 per cent is imported from other states.

A very encouraging item is the continued increase in the percentage of pasteurized milk. There has been a substantial increase in each of

TABLE XII

COMMUNITIES IN MASSACHUSETTS WHICH REQUIRE THAT ALL MILK BE EITHER PASTEURIZED OR FROM TUBERCULOSIS-FREE CATTLE (1929)

Group	Number of Towns in Group	No. of Towns Having Reqm.	% of Towns Having Reqm.	Pop. of Group	Pop. having Requirement	%
50,000–Over	18	15	83.3	2,413,960	2,123,788	88.0
25,000–50,000	12	8	66.7	471,157	315,592	67.0
15,000–25,000	27	13	48.1	513,533	261,278	50.8
10,000–15,000	18	8	44.4	219,033	98,093	44.7
5,000–10,000	52	9	17.3	372,634	66,641	17.8
2,500– 5,000	61	9	14.7	208,106	31,935	15.3
1,000– 2,500	85	11	12.9	140,732	18,427	13.1
0– 1,000	82	5	6.1	41,308	2,953	7.1
Totals	355	78	22.0	4,380,463	2,918,707	66.6

the population groups considered, and while for all the groups the total percentage has increased from 83 per cent to 85.7 per cent, the total for the first four groups has increased from 83 per cent to 87 per cent. Almost 25 per cent of the milk sold raw in communities of over 10,000 in 1926 is now pasteurized. As one would expect, the percentage of pasteurized milk is highest in the larger communities. The range is from nothing to over 99 per cent. However, some of the smaller communities are outstanding in the exceptional relative amount of pasteurized milk used. This is very encouraging, but on the other hand it is very discouraging to note that in a number of large cities the per cent of pasteurized milk ranges around 40 to 50 while other cities of corresponding size have more than 99 per cent of their milk pasteurized. When we consider that, in general, the larger routes are in the larger places, we realize (thinking quantitatively) that the menace of milk-borne disease is concentrated in a few particularly lax, fairly large communities.

The percentage of certified milk has increased from about 0.6 per cent to about 1 per cent. Because of the small figures this information is not so accurate as for pasteurized milk, but undoubtedly there has been an increase in the use of certified milk. It is of interest that this increase has occurred to a greater extent in smaller communities.

Of the 355 cities and towns in the state, 208 (58.6 per cent) report having some milk inspector. All communities over 25,000 so report, but there are 12 between 5,000 and 25,000 without any. Surely this is not good! Moreover, milk inspection, when it does exist, is as poor in some communities as it is good in others.

In 1926, communities giving this data report 10.3 chemical and 4.9 bacteriological examinations per 100,000 quarts of milk, while in 1928 the figures are 10.4 and 5.4, respectively. They report that 13.1 per cent of the samples of raw milk not intended for pasteurization showed counts over 300,000 per c.c. It is distressing that a number of communities allow milk to be sold raw which under our present regulations would not be accepted for pasteurization. In 55 communities the average percentage of total solids was 12.59, while from 62 communities the per cent of butter fat was 3.81. In general, these figures increase somewhat from larger to smaller communities.

Table XII shows the communities in Massachusetts, by population groups, which require that all milk be either pasteurized or from tuberculosis-free cattle. We have reached the paradoxical situation in which it is safer for children to secure their milk in most urban communities than in most rural communities.

SUMMARY

This report is based upon data from 95 of the 125 communities over 5,000 and covers 3,604,314, or 83 per cent of the entire population of the state. We are impressed that the smallest of these communities have almost no protection of their milk supplies.

The proportion of all typhoid fever traced to milk has been increasing markedly, while for scarlet fever it has been decreasing. Over the period of 34 years, the four diseases considered range themselves by outbreaks in the following order of magnitude: typhoid fever, scarlet fever, septic sore throat, and diphtheria; but by total cases in the following order of magnitude: septic sore throat, typhoid fever, scarlet fever, and diphtheria. As pointed out in our preceding report,* the rate of decrease of total cases spread by milk is greater than the decrease of outbreaks so spread. This suggests that fewer persons are exposed to each outbreak, and that therefore they tend to occur in a higher proportion of instances on smaller milk routes than formerly. This bears out the evidence that the smaller dealers less frequently protect their milk by pasteurization.

Nineteen twenty-nine is the first year, since the first outbreak of typhoid fever was reported, that has not witnessed a milk-borne outbreak of this disease. There has been no outbreak of diphtheria for four years.

Although the data are open to question, there is no evidence of an increasing consumption in milk over a 10-year period, in spite of the intensive health and commercial propaganda on this subject. As would be expected, the proportion of Massachusetts produced milk increases with the decreasing size of the community.

Since 1919 there has been an encouragingly marked increase in the proportion of milk pasteurized, in general being higher in the larger communities. On this, more than any other single factor, must we depend for the eventual obliteration of milk-borne disease.

Although the figures are too small to be of much significance to the public health, the apparent increase of certified milk would suggest a growing realization that if raw milk is to be consumed, it must have the maximum protection. The recent discussion of certified-pasteurized milk, which to us seems to be the ideal milk, leads to the hope that this product may eventually become a factor in our milk supply.

It is shocking to learn that 147, or 41.4 per cent of our communities, have no shadow of an inspector of milk, the most important and vulnerable of our foods. When we see that 12 of these communities have populations over 5,000, our patience is well nigh exhausted, particularly if we consider also the number reporting inspection which is gravely inadequate. In the last two years there has been a slight increase in the protection offered by the bacteriological examination of milk.

With varying competence in laboratory service, the proportion of high counts by communities is opened to much question. But our data would substantiate the general impression that all in all the larger the community the cleaner and safer the milk, because of better regulations, more competent inspection and more pasteurization.

The percentage of total milk solids and butter fat by population groups shows nothing striking.

There has been a most encouraging increase in the number of communities annually adopting regulations requiring that all milk be either pasteurized or from tuberculosis-free cattle. This has been most marked in the larger communities.

However, since there are still 30 per cent of our people who live in cities and towns which allow raw milk from tuberculous cattle to be sold, this movement against milk from tuberculous cattle must be expedited by state regulation.

NOTE: We are indebted to Helen Smith of the Department staff for valuable assistance in the preparation of the statistical tables.

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Commonwealth of Massachusetts

THE State Department of Public Utilities has issued an order specifying the contents of first-aid packages to be carried by railroads.

The present order provides that every railroad corporation shall carry upon each engine or rail motor car and in a car of each passenger train and in the caboose car of each freight train at least one first aid package containing:

1. Four aseptic gauze pads for large wounds, 2¾″ by 3″, made of 12 thicknesses of No. 1 A gauze, with a gauze bandage 2″ wide and 60″ long attached for fastening pad to wound, and with the pad sewed to the middle of the bandage.
2. Four aseptic gauze pads for small wounds, 1½″ by 2″, made of 12 thicknesses of No. 1 A gauze, with gauze bandage 1″ wide and 18″ long.

Said gauze pads and bandages to be contained in individual glassine envelopes, those containing small dressing to be marked "For Small Wounds" and those containing large dressings to be marked "For Large Wounds."

3. Four mercuroply applicators of a size not less than those contained in a packet marked "A" and dated July 25, 1930, on file with the railway and motor bus inspection division of the department.
4. One-quarter ounce of bicarbonate of soda and petrolatum for burns.

An Effective and Practical Definition of Pasteurization*

LESLIE C. FRANK, C. E., F. A. P. H. A.

Sanitary Engineer in Charge, Office of Milk Investigations, U. S. Public Health Service, Washington, D. C.

AN effective and practical definition of pasteurization should satisfy the following criterions:

1. It must be effective with respect to the killing of any pathogens in milk.
2. It must be practical with respect to its enforcement by the health official.
3. It must be practical with respect to its application by the dairy industry.

The 1929 issue of the *Standard Milk Ordinance and Standard Milk Control Code*, recommended to American municipalities by the U. S. Public Health Service, contains the following definition of pasteurization which it is believed satisfies the above criterions.

Pasteurization—The terms "pasteurization," "pasteurized," and similar terms shall be taken to refer to the process of heating every particle of milk or milk product to a temperature of not less than 142° F., and holding at such temperature for not less than 30 minutes in pasteurization apparatus approved by the health officer, provided that approval shall be limited to such apparatus which requires a combined holder and indicating thermometer temperature tolerance of not more than one and one-half degrees Fahrenheit (1½° F.), as shown by official test with suitable testing equipment, and provided that such apparatus shall be operated as directed by the health officer and so that the indicating thermometers and the recording thermometer charts both indicate a temperature of not less than 143½° F., continuously throughout the holding period, provided that nothing contained in this definition shall be construed as disbarring any other process which has been demonstrated as of at least equal efficiency and is approved by the state health authority.

It will assist in understanding why this definition satisfies the three criterions if we first examine it in detail and ascertain the reasons for each clause or phrase of which it is composed.

The first clause, namely, that "pasteurization . . . shall be taken to refer to the process of heating every particle of milk to 142° F. and holding at such temperature for not less than 30 minutes," is the

* Read at a Joint Session of the Food, Drugs and Nutrition and Public Health Engineering Sections of the American Public Health Association at the Fifty-eighth Annual Meeting at Minneapolis, Minn., October 3, 1929.

"core" of the definition. It implies, of course, that a temperature of 142° F., if actually applied to every particle of milk for 30 minutes, will kill or render non-dangerous any milk-borne pathogens which may be present. It is believed that the majority of leading bacteriologists will concur in this assumption.

The second clause, "in pasteurization apparatus approved by the health officer," is included in the definition because failure to include it might lead to disagreement between health officers and pasteurization plant owners or pasteurization machinery manufacturers, as to whether a given type of pasteurization equipment is so designed as to be capable of reliably applying a temperature of 142° F. to every particle of its milk contents for 30 minutes. Some agency must have final authority to pass upon such questions and it is believed that the health officer is the proper agency.

It is suggested that the health officer's approval should be based in general upon whether the apparatus in question complies with the design specifications contained in the *Standard Milk Control Code* recommended by the U. S. Public Health Service, since this will have the advantage of promoting standardized design requirements; and in particular upon whether the apparatus meets the temperature tolerance provision of the next clause of the definition. Whether the apparatus complies with the first requirement may be ascertained by simple inspection of the apparatus itself, or its blue prints. Whether the apparatus complies with the second requirement can be determined only on the basis of records of actual official tests.

The third clause, "provided that approval shall be limited to such apparatus which requires a combined holder and indicating thermometer temperature tolerance of not more than 1½° F.," is included in the definition because it has been determined by careful engineering tests of many types of pasteurization equipment that it is easily possible to design and construct pasteurization equipment which does not require a temperature tolerance greater than 1½° F. The inclusion of this clause in the definition will support the health officer in resisting any pressure to induce him to accept a greater tolerance.

It may be advisable to explain for the lay reader the meaning of the term "temperature tolerance" as used in the definition. Explained in non-technical language, the phrase means that the health officer shall approve only apparatus which is so designed and constructed that when its indicating thermometer registers an "apparent" temperature of 143½° F., the lowest actual temperature of any particle of milk in the system will be not less than 142° F. In other words, the temperature tolerance is the maximum difference allowed

between what the thermometer leads one to believe is the temperature of the coldest drop of milk and the actual temperature of the coldest drop.

The term "combined holder and indicating thermometer temperature tolerance" is used because the 1½° F. tolerance is made up of an allowance of one degree for variations in actual temperature in the various corners and pockets of the holder system, plus a one-half degree allowance for deviations in the readings of individual satisfactory thermometers.

The fourth clause, "as shown by official tests with suitable testing equipment," is included in the definition in order to protect the health officer against any pressure to accept tests made by unofficial agencies such as the manufacturers, or private laboratories employed by the manufacturers, since in some cases such agencies might not be entirely unbiased.

"Official tests" should be interpreted to mean tests made by an official public health agency, that is, either by the city health department, the state health department, or by the U. S. Public Health Service. The term "suitable testing equipment" means testing equipment equal in performance to the thermocouple-potentiometer equipment used by the U. S. Public Health Service in its tests, with which it is possible to determine temperatures accurately in any portion of the holder system.

The fifth clause, "provided that such apparatus shall be operated as directed by the health officer," is included in the definition because even apparatus which is properly designed cannot be depended upon to pasteurize effectively unless properly operated.

Here again, just as in the case of design approval, it is recommended that the health officer's approval of the operation be based upon the provisions of the U. S. Public Health Service *Standard Milk Control Code,* since this will tend to promote standardization in operation requirements.

The details of both design and operation are incorporated in the *Standard Milk Control Code* rather than in the *Standard Ordinance* because their inclusion in the Ordinance would make this instrument unnecessarily long and greatly increase the cost of printing when enacted by municipalities. As it is, some small municipalities object to the present printing cost.

The sixth clause, "and so that the indicating thermometers and the recording thermometer charts both indicate a temperature of not less than 143½° F. continuously throughout the holding period," is incorporated in the definition in order to insure that even the coldest

particle of milk in the apparatus will have been held for 30 minutes at an actual temperature of at least 142° F. This will be true if the indicating thermometer indicates an "apparent" temperature of 143½° F. since the maximum temperature tolerance previously allowed in the design was fixed at 1½° F., and therefore the maximum temperature deviation in the system will be 1½° F. or less.

Not only the indicating thermometer, but also the recording thermometer chart, must show the required temperature for the full holding period, so that the health officer may assure himself that the required temperature is maintained for the proper length of time, not only when the inspector is present but also between inspections.

The question may be asked: What is to prevent the pasteurization plant from setting the recording thermometer so as to read a higher temperature than the indicating thermometer and thus delude the health officer?

The answer is that one of the detailed operation requirements given in the *Standard Milk Control Code* reads as follows:

> The setting of recording thermometers shall be checked against the indicating thermometers daily by the plant operator and at least bi-weekly by the health officer, and shall be kept adjusted so as at no time to read higher than the indicating thermometer.

It will be apparent that the enforcement of the above requirement would soon result in the discovery by the health officer of any attempt to defraud by incorrectly setting the recording thermometer.

The seventh clause in the definition, "provided that nothing contained in this definition shall be construed as disbarring any other process which has been demonstrated as of at least equal efficiency, and is approved by the state health authority," has been included in the definition in order to prevent the definition from discouraging attempts to develop new and improved methods of pasteurization. It is conceivable, for example, that effective and practical methods of applying higher temperatures and shorter exposures may be developed and generally accepted by health authorities in the future. Unless this clause were included in the definition, it would be necessary to reword the definition in order to make the acceptance of such a method by the health officer legal. With the clause included it will be legal for any state health officer to admit other methods of pasteurization which may be demonstrated to him to be effective. As soon as such acceptance is general, the detailed requirements of the new method may be included in the definition.

Having now discussed the details of the definition of pasteuriza-

tion we may discuss the reasons the definition satisfies the three criterions previously given, namely:

1. That it is effective with respect to the killing of milk-borne pathogens.
2. That it is practical with respect to its enforcement by the health officer.
3. That it is practical with respect to its application by the dairy industry.

That the definition is effective with respect to the killing of milk-borne pathogens will have been clear from the detailed discussion already given.

That the definition is practical with respect to its enforcement by the health officer will be apparent when it is pointed out that the officer's duties are principally limited to the following:

1. He or his inspector must examine every pasteurization apparatus in use in the plants in his city and check the design characteristics against the design requirements listed in the *Standard Milk Control Code* with respect to thermometers, inlet and outlet valves, foam heating devices, vat and pocket covers, and holding time in the case of apparatus in which the holding time is automatically controlled.

2. He or his inspector must approve only such apparatus as meets these requirements and which has been found by his own tests or by those of the state health department or of the U. S. Public Health Service to show a deviation in temperature between the hottest and coldest particles of milk of not more than one degree Fahrenheit. (The U. S. Public Health Service is now preparing reports of tests on all widely used pasteurization apparatus.)

3. The indicating thermometer used must be checked against a standardized thermometer and show a deviation therefrom of not more than one-half degree Fahrenheit between 142° F. and 145° F.

4. The operation of each pasteurization apparatus must be inspected to see that it complies with the requirements listed in the *Standard Milk Control Code* as follows: (a) routine checking of the recording thermometers against the indicating thermometers; (b) the routine checking of the recording thermometer charts to see that none of the holding period sections of the curves shows a recorded temperature of less than 143½° F., and to see that each chart has inscribed upon it the reading of the indicating thermometer during a holding period, and the time at which the reading was taken; (c) the occasional inspection of all single vat installations which are not provided with leak protector valves to see that they are disconnected from the raw milk supply and from the outlet piping during the times required by the code; (d) the disinfection of outlet valves immediately prior to the discharge of pasteurized milk; (e) the proper use of foam heating devices; (f) the keeping closed of all vat and pocket covers during operation; (g) the pre-heating of all holders to at least the pasteurization temperature when required by the code.

It is believed that it is reasonable to state, therefore, that the "definition of pasteurization in the 1929 *Standard Ordinance* and *Code* is practical with respect to its enforcement by the health officer."

Finally, it is believed that the definition is practical with respect to its application by the dairy industry, because there is no requirement connected with it which is not easy to apply. Many pasteuriza-

tion plants located in cities enforcing the *Standard Milk Ordinance* are complying with the definition without difficulty. Furthermore, the principal objection to many present pasteurization definitions in the eyes of the industry has been avoided, namely the matter of cream line damage. There is no danger of damaging the cream line if the definition is intelligently applied by the pasteurization plant operator.

DISCUSSION

The Practical Aspects Concerned with Securing Enforcement of Suggested Definition for Pasteurization

GEORGE W. GRIM, V. M. D., F. A. P. H. A.

Milk Control Officer, Milk Control District No. 1, Ardmore, Pa.

THE proposed definition for pasteurization suggests a minimum heat treatment (142° F. for 30 min.) to which every particle of milk must be subjected. It establishes a temperature tolerance of 1° F. to allow for what are described as reasonable variations in the milk when processed commercially in apparatus of approved type. An additional tolerance of ½° F. is established for acceptable inaccuracies of indicating thermometers. It is contemplated that the combined temperature tolerance of 1½° F. be added to the 142° F. minimum, operation to be of a character to insure that the indicating thermometer and the recording thermometer charts both show not less than 143½° F. continuously throughout the holding period.

Granted such operation, the control official is to assume that no particle of milk undergoing treatment will fall below 142° F. at any time during the 30-minute holding period; provided the process has been carried out in apparatus approved by the health officer and that such apparatus shall be operated as the health officer may direct.

The terms of the definition restrict the health officer from approving commercial pasteurizing apparatus in which the combined holder and indicating thermometer temperature variation is more than 1½° F. Temperature tolerances have been provided for recognized variations in the temperature of heated milk during the required holding period, resulting from imperfections inherent in apparatus of approved type, also for recognized inaccuracies of indicating thermometers, but not for recognized temperature variations always occurring during the course of ordinary milk plant operation, the result of reasonable and unavoidable deviations from any established procedure which the operator may endeavor to follow in the practical operation of commercial pasteurizing apparatus.

Safety margins, contained in pasteurizing definitions enforced during the past decade, were imposed, not primarily for the purpose of compensating for recognized defects current in pasteurizing apparatus, or for the purpose of compensating for inaccuracies of indicating thermometers, not required; but chiefly, for the purpose of compensating for recognized variations in the heat treatment of milk resulting from operation approximations of commercial practice. The proposed definition, while expressly recognizing the need for proper operation, fails to recognize any

need for this margin of safety. Accordingly, the health officer must expect to secure 100 per cent compliance upon the part of the milk plant in operating the pasteurizer as he may direct.

One must at once be impressed by the many new responsibilities to be assumed by the control official in the matter of pasteurizing equipment, particularly in the matter of the health officer placing his stamp of approval on the different pasteurizer designs, also the assumed responsibility of specifying precisely how apparatus should be operated to obtain a fixed result.

It would seem entirely agreeable to accept the proposed minimum heat treatment as effective for the destruction of milk-borne pathogens if actually applied to every particle of milk. To be effective, however, pasteurization must be conducted in proper apparatus under proper control. To be practical with respect to their application, the requirements must be such that the operator can carry them out in the course of ordinary milk plant operation.

To insure enforcement of that portion of the suggested definition which deals with approved apparatus it has been recommended that the control official's approval be based upon the design specifications prescribed in the *U. S. Standard Milk Code*. For the purpose of discussion let us assume that a certain pasteurizer has satisfied these design specifications. The health officer is then to place his approval upon the pasteurizer and permit its use, provided it is operated as directed by the control official. It now becomes the task of the health officer to direct the operation of the apparatus which he has approved in such manner that the variation in temperature between the hottest and coldest particles of milk undergoing treatment will never be greater than 1° F. In order that this requirement may be easily carried out by the control official he is again referred to the *Code* from which he is supposed to obtain information sufficient to direct the proper operation of a given design.

While it is contemplated that pasteurization shall be carried on only in apparatus of approved design, does it of necessity follow that such apparatus, when operated so that the recording thermometer charts indicate a temperature of not less than 143½° F. continuously throughout the holding period, actually applies at least 142° F. for at least 30 minutes to every particle of milk?

Assuming that apparatus approved upon the basis of the specifications of the *Code* has been operated as recommended—is the health officer justified in accepting a temperature tolerance of 1½° F. as sufficient to insure the heating of every particle of milk to at least 142° F. for 30 minutes?

Whether effective pasteurization would result from the application in the field of the suggested definition, and whether the definition is practical with respect to its enforcement by the health official and with respect to its application by the dairy industry, are questions which must be answered—from our experiences in the supervision of the pasteurization process, from an examination of apparatus now in use in the majority of our plants, and from an examination of the design and operating specifications of the *Standard Milk Code* which the U. S. Public Health Service recommends to health officers for use as a text in approving and directing the operation of the various pasteurizers.

Under " Design specifications to be met in order to secure health officer's approval " we find rather specific instructions concerning acceptable locations for the various types of thermometers required on pasteurizing apparatus. Much space is given to specifications to be followed by manufacturers in the construction of thermometers for use by the dairy industry and the control official. With slight ex-

ceptions, the only references in the *Code* concerning design specifications of the pasteurizer which the health officer is to approve concern themselves with the character of valves through which the milk enters or discharges, and the pasteurizer lids or covers.

Aside from the requirement that reasonably accurate and easily readable thermometers be used to indicate and record the temperature of milk undergoing treatment, the thermometer specifications have little value other than tending to standardize types of thermometers used for pasteurization. On the other hand, the design specifications, if followed by the health officer, would result in his approving of the use of apparatus not designed to furnish a record of the full heat treatment applied to the milk. Strict interpretation of present pasteurization definitions does not permit the operation of apparatus without recording upon a chart the full heat treatment applied. While most health departments have in the past failed to enforce the provisions relating to temperature records of milk in holders supplied at the pasteurizing temperature, it is considered entirely practical to obtain such records in every design of pasteurizer now in use, with the possible exception of one. Therefore, with respect to location of thermometers the control official should consider the design specifications applicable to vat, pocket or continuous flow installations into which milk passes at pasteurization temperature inadequate, because they fail to require any record of the full heat treatment applied in three of the four types of equipment mentioned in the *Code*, namely vat, pocket and continuous flow, into which milk passes at pasteurizing temperature. The control official should most emphatically refuse to approve any and all designs of apparatus not equipped to furnish a satisfactory record of the full heat treatment applied in an endeavor to effect pasteurization.

A record of the full heat treatment applied in holders supplied at the pasteurizing temperature is essential to the control official for the following reasons:

1. To aid in determining whether each pocket of holder was pre-heated to at least the pasteurizing temperature immediately before the milk was passed into the apparatus.
2. To indicate effectiveness of device for heating air in holder above the milk.
3. To show cold air leakage into holder particularly during interval between emptying and filling.
4. To record holding time and temperature of milk in each individual pocket of holder. (Temperature reductions occasionally occur during unavoidable shutdowns in milk plant operation. Were the control official to base his approval of apparatus on the design specifications recommended by the U. S. Public Health Service *Milk Code* there would be no record of supposedly pasteurized milk that had fallen below the minimum temperature from some cause and which had been raised to the pasteurizing temperature in the holder just before the operator permitted it to pass over the thermometer bulb located in the outlet manifold.)
5. To record variations in temperature of milk in pockets caused by variations in temperature of water used in maintaining temperature of apparatus.
6. To comply with paragraph I, Item B of suggested code: "The pasteurization equipment shall be operated so that the indicating thermometer and the recording thermometer charts both read at least the temperature which the definition of pasteurization requires the thermometers to show continuously through the holding period."

The specifications concerning location of thermometer fittings "to conform to that of standard International Association Milk Dealers wall type fitting" should

be objected to. Why should the International Association of Milk Dealers be authorized by the health department to designate location of seat of indicating thermometer in "batch type pasteurizer"?

MAINTAINING MINIMUM HOLDING PERIOD

The design specification in the *Code* under the above heading would specifically authorize the dairy industry to operate holders equipped with automatic, controlled effluent and affluent valves in such a way that the control official would have absolutely no record of the time period the milk was held, its temperature during the holding period or the interval of lapsed time between the opening and closing of such automatic valves.

In lieu of recorded holding time the *Code* suggests that the control official accept certain design and operation conditions which he may prescribe and require in the case of automatically timed pocket type or continuous flow holders. In my opinion it is just as essential to have a full record of the heat treatment applied to milk passing through a continuous flow holder as it is to have a similar record for a single manually operated vat installation. In the case of the manually operated vat the *Code* demands a record and goes into detail to explain how the control official should read the chart in order to approximate the holding time applied. In the case of the flow holder the *Code* merely requires that the control official test the holder when installed, following repairs or alterations, see that it has an apparent holding time of 31 minutes, and satisfy himself that its construction and operation will insure proper holding of the milk. I am amazed that such a procedure should be considered adequate and that having followed it, health officers of this country should be urged to approve apparatus of this type. Almost while your back is turned the operator can increase the rate of flow of milk through such holders more than 30 per cent with no record left of his manipulations. That such increases in rate of flow are common in the operation of milk plants at present may be illustrated upon charts made by a speed recorder installed upon a milk pump supplying milk to a continuous flow holder. Figure I illustrates that during a single day's run three changes were made of a small pinion gear resulting in increasing the speed of the pump supplying milk to the holder to a point considered well beyond the legal holding capacity of the apparatus.

The control official will do well to consider any pasteurizer not equipped to give a record from which he may at least approximate the minimum holding period of milk undergoing treatment potentially dangerous and beyond the scope of his control. Therefore, before any serious consideration should be given to the matter of accepting even tentatively a holder of the flow type proper records to indicate the rate of operation should be demanded and obtained by the control official. It is entirely practical to make such records in the course of milk plant operation. I would refuse in the interests of the milk consuming public either to approve or to accept pasteurizing equipment meeting fully the design specifications of the *Code* as they apply to holders of this type.

In the case of automatically operated valves of pocket type holders a record of opening and closing of the valves should be required before acceptance is granted.

INLET AND OUTLET VALVES

The design specifications of the *Code* recommend the acceptance of valves with pockets and suggest overcoming this defect by continuous steaming. The control

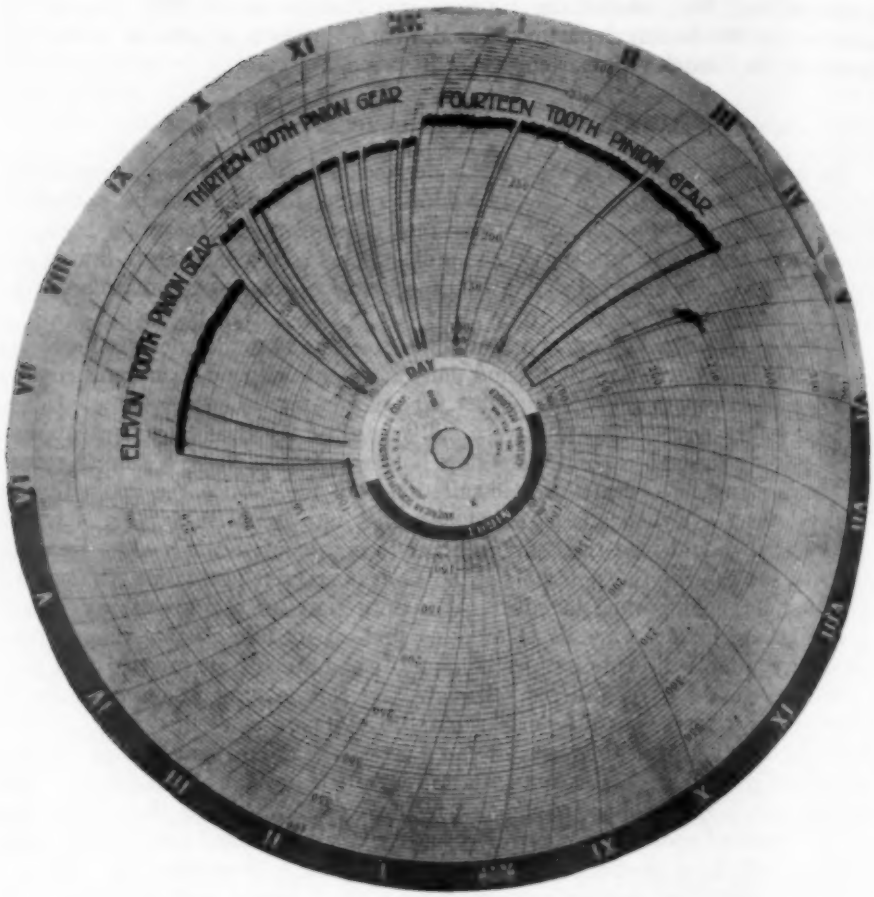

FIGURE I—Reproduction of graph made by speed recorder designed to record rate of operation. The graph indicates three recorded increases in speed of pump supplying milk to holder. The increases in speed of the milk pump have been produced by changing a pinion gear attached to the shaft of the motor driving the pump. By replacing one pinion gear with another the presumed 30-minute holding period is materially shortened. The graph made by the pen falling toward the center of the chart evidences the frequency and duration of shutdowns occurring during the course of a single day's operation. Except for a few isolated instances, recording devices capable of making records, as shown in Figure I, have not been used as an aid in controlling the pasteurizing process.

official should refuse to accept such non-flush type valves because experience has already proved the requirement for continuous or automatic steaming not practical with respect to its application by the dairy industry. Steam pressures, particularly in small plants, where such valves are most frequently met with, are subject to extreme variation and cannot, under the varied conditions of milk plant operation, be depended upon to keep milk contained in such pockets at the pasteurization temperature. It is entirely practical for the industry to supply pasteurizers with valves which do not have to be steamed continuously. The operating specifications relative to valves require automatic steaming of valves, just prior to the discharge of

milk, in all types except single vat installations. From my own experience and observation in cities reputed to have succeeded in eliminating defects current in pasteurization apparatus I am convinced that attempts at automatic steaming of valves have in many instances resulted in failures even to heat the valve which was supposed to be automatically steamed. The problem of water-logged steam lines, resulting from steam trap and boiler deficiencies, has rendered many attempts at automatic steaming wholly worthless. Therefore I would recommend that the health officer refrain from considering satisfactory past effort to sterilize outlet valves by automatic steaming. The manufacturers should be urged to provide more dependable methods for accomplishing the desired result. For the present disconnecting the outlet valve and sterilizing by heat manually appears most dependable.

FOAM HEATING

In order that any differences between the temperature of foam and that of milk beneath might be kept within the 1° F. tolerance established for the apparatus by the definition, the *Code* provides that if foam is present the atmosphere above milk shall be kept at pasteurization temperature. Exactly how the health officer is to accomplish this is not clear. The admission of steam into the air space beneath the lids is suggested. There is a statement about using a steam trap properly designed to avoid the discharge of water into the milk. So far as I have been able to learn all steam traps are so designed, but none that I have ever used or observed avoided the discharge of water into the milk at certain times during the varied conditions which present themselves in the usual course of milk plant operation. It is difficult to understand how this feature of the foam heating problem could be classed by Mr. Frank in the category of requirements "easy to apply."

I have often tried to heat foam and to maintain proper pasteurization temperature in it. Foam may occur at any time in any type of holder, so all types must be designed to cope with it. Milk foam is an extremely peculiar and elusive substance. At one season there may be none; at another much. Today it may be low and fine in texture, tomorrow upstanding and coarse. I have never succeeded in maintaining foam temperatures at a point equal to the milk throughout the day's run. I consider satisfactory heating of foam the most difficult problem to overcome in eliminating defects of pasteurization apparatus. Certainly we have not yet progressed to the point where every particle of foam in the various types of apparatus, entitled to approval under the design specifications of the *Code*, is maintained at a minimum of 142° F. when the indicating thermometer indicates 143½° F. On the contrary, the practical application of pasteurization commercially even in plants of the better type is such that foam temperatures are frequently 10 or 15° F. below those of the milk as indicated by the recording thermometer. From a practical standpoint it might be stated that efforts to maintain satisfactory temperature of foam have not yet commenced. Except for an extremely small number of large automatic vat or pocket type holders of modern design, practically no effort is being made by pasteurizing plants either to heat foam or maintain the temperature of the air above the milk at a point equal to the milk. Therefore, data are not yet available upon which to base a conclusion that a definition for pasteurization which establishes a temperature tolerance of but 1° F. and exacts 100 per cent compliance in adhering to operating directions is practicable either with respect to its enforcement by the health officer or its application by the dairy industry.

VAT OR POCKET COVERS

The *Code* sets forth design specifications calculated to prevent anything from falling into the vat in either the open or closed position. It appears that an important point has been overlooked here—that of requiring the lids to be "tight fitting and properly insulated."

PREHEATING OF HOLDERS

The *Code* is not clear concerning how preheating is to be accomplished. Many holders are not provided with independent means of temperature maintenance. Vat or pocket type pasteurizers are frequently insulated with cork and unless sufficient heat is supplied to such apparatus at the commencement of the day's run, temperature balance of the holder will not be acquired from the heat supplied to the milk. This fact is recognized by the *Code,* which suggests as a remedy the heating of the apparatus by steam or otherwise before the holding period begins. I do not consider it either proper or safe to accept or approve any holder which receives the milk at the pasteurization temperature unless such holder is so constructed that the temperature of the pockets can be brought to the pasteurization temperature—and that such fact be registered upon recording thermometers installed upon each pocket—before the heated milk is passed into them. If satisfactory temperatures cannot be obtained before the milk enters, final heating should be effected in the holder. I should also require in this type of holder that means be provided in each pocket to raise the temperature of the milk in the event of mishaps, such as heater failure or shutdowns, resulting in milk falling below pasteurization temperature.

OPERATION SPECIFICATIONS

One of the most notable requirements of the proposed definition is the clause, "provided that such apparatus shall be operated as directed by the health officer." Mr. Frank suggests that the health officer's approval of operation be based upon the provisions of the U. S. Public Health Service *Standard Milk Code*. Design approval is limited to apparatus which requires a holding temperature tolerance of not more than 1° F. How is the control official to direct such operations? The *Code* does not begin to tell him how to operate commercial apparatus so that temperature variations during operation, day after day, will be not more than 1°. In the practical application of heat to milk under commercial conditions we simply do not have plants capable of sustained operation within the narrow limits of 1° F., and neither this nor any other definition for pasteurization will provide them.

The best that can be hoped for is to select, after careful study has been made of the various types of equipment, under the varied conditions of milk plant operation, some reasonable temperature margin to be added to a temperature margin necessitated by unavoidable variations resulting both from imperfections in thermometers and apparatus, the sum to represent a safety margin necessary to compensate for the uncontrollable and varied fluctuation in ordinary milk plant practice. That Mr. Frank himself realized this is clear from a paper he presented at the Buffalo meeting of this Association: "That a proper definition of pasteurization will be one which applies to every particle of milk pasteurized and which requires in addition a margin of safety for the design and *operation approximations of commercial practice.*"

I submit that absolutely no margin of safety to cover *operation approximation of commercial practice* has been included in the definition suggested here.

I submit further that commercial pasteurization plants of the present day cannot begin to operate within the narrow limits of 1° F. as a maximum under the varied conditions they are called upon to meet.

The conclusion drawn that the suggested definition for pasteurization is practical with respect to its enforcement by health officers and with respect to its application by the dairy industry is without a sound basis and misleading.

It has not been shown by data or otherwise that a combined temperature and indicating thermometer tolerance of 1½° F. will insure the heating of every particle of milk to at least 142° F. in the various described approved designs of pasteurizing apparatus, nor that ordinary commercial pasteurizing apparatus can be successfully operated within the range of the tolerance suggested.

It has not been shown that the requirements exacted by the proposed definition are practical with respect to their application by the dairy industry, nor their enforcement by the health official, nor that they are *easy to apply*.

A proper definition of pasteurization will be one that provides a satisfactory margin of safety to compensate for reasonable design imperfections of apparatus, inaccuracies of thermometers and for reasonable and unavoidable variations resulting from operating approximations of commercial practice. An extensive study of the variable conditions in average milk plants likely to affect operation of the various types of pasteurizing apparatus is necessary to establish a basis for a temperature margin to compensate for reasonable operating approximations of commercial practice. Extensive studies, with the publication of data showing temperature variations of milk, foam and air in the various designs of pasteurizing apparatus are necessary for the same reason. Pending the publication and acceptance of results of such studies it is suggested that the health officials require that milk sold as pasteurized be heated for 30 minutes at a temperature of 145° F.

CLOSING REMARKS

LESLIE C. FRANK, C. E.

IT should be noted that Dr. Grim's criticisms are directed largely at the design and operation specifications for pasteurization machinery contained in the *Standard Milk Control Code*, rather than at the definition of pasteurization itself.

1. The only one of Dr. Grim's criticisms which is directed at the definition itself is that it does not contain an adequate margin of safety to cover design and operation deviations of commercial practice.

The margin of safety embodied in the definition is the difference between the required temperature of 143½° F. and the lethal limit for milk-borne pathogens. Most authorities agree upon 140° F. as the lethal limit when a time of 30 minutes is used. One and one-half degrees of the 3½° margin is intended by the definition as a *design* tolerance, and the definition requires that the health officer shall not approve any apparatus which shows a temperature deviation greater than 1½° when properly operated. The researches of the U. S. Public Health Service indicate that properly designed machinery can easily meet this requirement.

As to an *operation* margin or tolerance I have come to the conclusion that such a tolerance is illogical and dangerous. Every plant should be required to comply strictly with the 143½° F. minimum, all operation deviations to be *above* this temperature, and the plant should be punished by de-grading or revocation of permit whenever it fails to comply. Dr. Grim suggests 145° F., and it is assumed that he means this temperature to be one at which the operator will *aim*, and *above and*

below which the operation deviations will occur. As a matter of fact, a definition of 143½° F. which is rigidly enforced as a *minimum* will result in a higher actual temperature than a definition of 145° F. which is *aimed at* by the operator, but which is deliberately assumed to allow for operation deviations of unknown magnitude.

As before stated, Dr. Grim's remaining criticisms deal with the machinery specifications and not with the definition. They are very briefly discussed below:

2. Dr. Grim objects to the fact that the *Standard Milk Control Code* does not require any record of the holding time in automatically timed holders. He states that this would make it possible for the plant operator to delude the health officer by changing a pinion gear, for example, in order to change the time. May I point out that no definition, not even the 145° F. definition suggested by Dr. Grim, will prevent fraud. Fraud must be overcome by inspection and by a proper, wholesome relationship between the inspector and the plant. It cannot be overcome by changes in the definition or in the specifications. If properly designed, automatically timed pasteurizers are not fraudulently tampered with, the milk will automatically and dependably be held for the proper time. The addition of time recorders will merely result in transferring the fraudulent intent from the pinion gear to the time recorder.

3. Dr. Grim further objects to the fact that the *Standard Milk Control Code* does not require flush type valves where the outlet valves are coupled close to the holder and continuously heated. He criticizes the practice of valve steaming because he has noted imperfect compliance in several instances. It is emphasized that the faulty instances he reports should not be permitted to discredit successful practice. There is no sound engineering reason why steam cannot be forced continuously through a steam port in a valve.

4. Dr. Grim's third criticism is that the *Code* requires automatically operated valves to be disinfected automatically, which he disapproves. He states that he has observed several instances of improper compliance with this requirement. Here again there is no sound engineering reason why steam cannot be automatically admitted to valves which open and close automatically and we should not allow ourselves to be misled into changing this item merely because certain plants have been observed to be improperly carrying it out.

5. Dr. Grim further criticizes the *Standard Milk Control Code* because he believes its requirement that the air above the milk surfaces shall be kept at or above the pasteurization temperature in order that any milk foam may be kept at or above the pasteurization temperature, cannot be accomplished, and that when it is attempted to heat the air by admitting live steam, water of condensation will be added to the milk, to which he objects.

The U. S. Public Health Service has experimented with several methods of heating the air above the foam. It has been impossible to secure satisfactory results by dry-heating the air, but the admission of wet steam directly to the air itself has given satisfactory results. It is possible that the unsuccessful results reported by Dr. Grim were in connection with attempts to use the dry-air method. His objections to the use of steam on the score that water of condensation will enter the milk is not considered sound. Even if the water trap were to fail utterly the result would only be a fraction of a thimblefull of water of condensation to each pint of milk. The sensible milk consumer would immediately prefer this negligible amount of water of condensation to the alternative of improper pasteurization.

6. Dr. Grim objects that the *Code* does not require the covers of vats and pockets to be insulated. The September, 1929, issue of the *Code*, which appeared several weeks before his discussion, makes this requirement.

7. Dr. Grim's objection that the covers are not required to be tight-fitting is considered to be indefinite. A requirement of hermetic sealing would be impracticable and it would seem that any other interpretation of "tight fitting" is satisfied by the requirement of the *Code* that the covers of vats be so constructed that nothing on top thereof will drop into the vat in either its open or closed position and that the covers of all equipment must be insulated and kept closed except in case of emergency.

8. Dr. Grim considers inadequate the requirement of the *Code* that certain types of holders shall be pre-heated with steam or otherwise so that the metal shall be at least at the pasteurization temperature before the holding period begins, because the requirement does not state how such pre-heating shall be accomplished. It is certain that it *can* be accomplished inasmuch as it is done every time the apparatus is sterilized by means of heat. It is believed that the *exact* method selected should be left to the operator.

9. Dr. Grim's next objection to the *Standard Milk Control Code* is that it does not require independent recording thermometers for each pocket of multiple pocket holders. He deems these necessary in order that a record may be had of the fact that the holder has been pre-heated. The *Code* now requires a recording thermometer in the outlet piping to which all of the pockets feed, and if pre-heating is not properly done the first milk temperature shown by the outlet recorder will be less than the required temperature, which will be sufficient evidence.

10. Dr. Grim's next objection is that the *Standard Milk Control Code* does not require each pocket to be equipped with independent heating means, which he thinks should be provided in order to prevent inadequately heated milk from reaching the cooler following heater failures or shut-downs. This is considered an unnecessarily complicated means of achieving an object which can be achieved by any one of three methods, an example of which is the automatic return-flow valve, which is more positive than Dr. Grim's suggestion. It should be noted that the object itself, which it is desired to achieve, is made mandatory by the *Code*.

FOUR WEEKS TO GET A NEW MEMBER!

SEPTEMBER 15 TO OCTOBER 13

During four weeks, September 15–October 13, members of the A. P. H. A. are being offered the opportunity to help strengthen their Association by bringing in new members.

Members joining during this drive will receive the magazine free during November and December.

The names of those who send in one new member each will be posted at the Fort Worth meeting and printed in the American Journal of Public Health. Those sending in more than one member will receive special mention.

What are you doing to coöperate with the Association in this effort?

EDITORIAL SECTION

Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.

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COMMERCIAL COOPERATION AND PUBLIC HEALTH

ONE of the opportunities easily available to health workers and of which too few take advantage is the coöperation that ethical commercial organizations offer for the furtherance of their public health programs.

Some of the best pieces of health education work in the United States are being done by commercial concerns. Many of them maintain expensive laboratories, in charge of scientists of high standing, which are constantly experimenting and adding to our knowledge of nutrition, milk sanitation, water purification, communicable disease control, and all of the branches of sanitary science.

There is hardly a problem that can be brought forth that some commercial house of sound reputation has not worked on and produced results, if not conclusive, at least suggestive.

Delegates to the Fort Worth Annual Meeting of the American Public Health Association will see an exhibit there in which fifty or more such organizations are participating. There is much to see and to learn in that exhibit. Their annual appearances at meetings of the American Public Health Association are regarded by most houses as the time to present new products, new services, new discoveries. The men and women in charge of the exhibits are trained workers, many of them recruited from the professional public health field and Association members of long standing. From the background of their own experience, they know public health and the application to it of the equipment and products they are exhibiting.

Every delegate to Fort Worth should plan his schedule so that

ample time is provided to study the exhibits and to make the acquaintance of the exhibitors. It would be wise to miss a paper now and then if necessary. This first-hand knowledge of what commercial organizations are doing to make our work easier or more effective will be valuable out of all proportion to the time spent in acquiring it.

GLUCOSE ("CORN SUGAR," SO-CALLED) IN FOODS UNDECLARED ON LABELS

THE recent attempts of certain interests to break down the effective enforcement of pure food laws by legislation in Congress having completely failed, these interests are again resorting to measures that smack of insincerity. This time it is the plan to accomplish their object by an administrative decision from the Secretary of Agriculture, in the guise of an economic farm relief measure.

The manufacturers of prepared foods have found great inspiration in the enforcement of the food and drug laws. The purposes of such laws are primarily to protect the interests of consumers, and, in their interest, to prevent deception and fraud in the sale of food.

The enforcement of food laws has resulted in a greatly increased consumers' confidence in the prepared foods shipped in interstate commerce and sold in our markets. The laws forbid, among other things, the labeling of foods in a manner whereby consumers may be deceived.

It has always been held that any added sweetness imparted to foods, in their manufacture, is understood by consumers to be due to sucrose (common sugar), and that any substitute used in the place of sucrose should be declared on the label.

Corn sugar is recognized as a wholesome product and its use in the manufacture of foods is now permitted, and has always been permitted, when used in such a manner that it would not work deception on the consumer.

However, corn sugar is distinctly different from sucrose. It is much less soluble; it is only about half as sweet; and it has distinctly different properties from those of sucrose when used in the manufacture of many foods.

In recent years we have learned much of the value of broadcasting facts concerning the diet in preventing deficiency diseases and thus promoting public health. Prepared foods make seasonal products available throughout the year and their effect in broadening the diet cannot be overestimated. Any decision which would weaken public confidence in prepared food would undoubtedly reduce consumption of such foods.

In recent years the manufacturers of this product have sought to influence the agricultural interests of the west by claiming that corn sugar is equally as suitable as cane or beet sugar in the manufacture of foods and might largely, or perhaps entirely, replace common sugar for this purpose. They have made exaggerated statements regarding the amount of corn sugar that might be used in foods and the amount of corn that might therefore be consumed in its manufacture.

This question is not a new one. It is merely another phase of the glucose or corn syrup question which has been before Congress and departments from the time the food and drugs act was passed.

The corn products manufacturers, who alone desire this change, opposed the enactment of the food and drugs act and since that time have sought by every means within their power to have their products used in a way that would deceive consumers.

The food laws of the country today are not economic measures, and should not be considered in that light. They are consumers' measures that simply inspire honest manufacture, fair trade and a square deal to the consumer.

This entering wedge in the pure food law, that would pave the way for all kinds of rulings or legislation that would, in the end, make possible wholesale adulteration and bring back the disgraceful condition that existed prior to 1906, should not be permitted.

Corn sugar, so-called, if all that its proponents claim for it, should be unafraid of making its presence known on labels.

The consumers' present confidence in food law requirement should be continued rather than substitute a policy of "Let the Buyer Beware."

THE LÜBECK AFFAIR

DURING April, 1930, some 246 infants were vaccinated with BCG, the stock cultures of which are said to have been bought in Paris and the sub-cultures made by Dr. Deycke of Lübeck, an experienced immunologist. Fifty of the children soon became severely ill with enlarged inguinal and abdominal glands and showed other symptoms of acute tuberculosis. At present, according to the latest figures available, 46 deaths have occurred while 68 children are gravely ill. Criminal proceedings have been instituted against the medical director of the Lübeck Health Office and the chief physicians of the State Hospital and the Children's Hospital.

This deplorable disaster has raised a number of questions and will doubtless give material for the antis to work on. The German health office has sent Professor Lange to investigate, while Professor Dryer

and Captain Douglas have been sent by the Medical Research Council from England. Unquestionably other investigations will also be made. Professor Calmette states correctly that no such accidents have followed the extensive use of BCG in France and other countries.

The vaccine has been studied by many bacteriologists and clinicians, and the general opinion is that it is innocuous and cannot produce active tuberculous lesions. Upon the other hand, two American workers, Petroff of the Saranac Lake Laboratory, and Watson of Canada, have found that it does sometimes cause tuberculous changes. Petroff, by the method of dissociation, was able to separate the vaccine into two types, one of which was virulent for guinea pigs while the other produced lesions which healed. Others have failed to confirm these results. Under Park, of New York, the vaccine has been used with apparently excellent results. It will be remembered that the late Dr. Trudeau held that a living culture was necessary to produce immunity against tuberculosis, and he was followed in this belief by many others. In recent years the trend has been toward killed organisms for all vaccines and ample experience has demonstrated the success of this method in such diseases as plague and typhoid fever.

Whatever may have been the cause of the illnesses and deaths in the Lübeck case it should not deter us from further studies of immunization against tuberculosis. A scourge which destroys so many lives annually in practically every part of the world demands our utmost endeavors. No one would think of abandoning the use of morphine, for example, because it has often produced death. Without doubt, the cause of the accident will be determined by the investigations under way, and the use of this vaccine, or some other, will be made safer on account of the studies brought about by this accident.

However, it must always be borne in mind that the manufacture of biological products requires the highest technical skill, and their administration should be always by, or under the direct supervision of, physicians. In the Lübeck case, it is said that the vaccine was given outside of the hospitals and by midwives.

THE EPIDEMIOLOGY OF TYPHUS

THE recent report by Dr. William Fletcher[1] of his researches into the nature of typhus-like diseases that occur in the Malay States has stirred up again the controversy of how typhus fever may be distinguished as a pathological and epidemiological entity. It is rather surprising to note Dr. Fletcher's insistence that a fever must not be called "typhus"—"the public will not allow these diseases to be called typhus"—because quarantine is unnecessary.

It is surely admitted that the real quarantine in the case of European *Typhus exanthematicus* is directed more against the louse than against the virus of typhus itself. It is at least doubtful whether the "sanitary cordon" drawn around Poland after the war was as important as the habits of cleanliness of the people living on this side of the frontier in preventing the development of a pandemic of typhus fever.

If a disease is carried by different vectors in different parts of the world, does it thereby become a different disease either pathologically or epidemiologically? Surely not! Neither should the mildness of the attack in sporadic cases of "typhus-like diseases" excuse them from being called "typhus."

A recently published letter of the Health Commissioner of Virginia[2] states that there were in 1929 21 cases of "typhus fever" in the State of Virginia, most of them quite severe and 7 of them fatal. The attempt to label smallpox as "alastrim" did not prevent it, either, from reverting occasionally to its virulent form.

Maxcy and Mooser have shown that the virus from endemic typhus can be propagated in the louse and that, under these circumstances, *R. Prowazeki* appear in the guts of these insects. This evidence, coupled with the evidence for the development of cross-immunity in animals, fully justifies Williams in speaking of the sporadic form of the disease in his state frankly as typhus fever.

It is perhaps not without significance that endemic typhus is not reported from the Mountain states, and that on the other hand a disease that is clinically and pathologically indistinguishable from typhus is reported from this region. It is true that the vector *Dermacentor Andersoni*, the Rocky Mountain tick, is not associated with typhus in other parts of the world. Again we would emphasize that a disease is not characterized by its vector. If ticks were as abundant upon the bodies of Coloradans as lice are upon the peasants of Russia, Rocky Mountain fever would almost certainly become an epidemic disease. In the meantime the same methods of experimentation may be applied here as in the case of the endemic typhus of the South. Not only the frank exanthematic form should be investigated, but also those milder forms recently described by Becker[3] in which a positive Weil-Felix test is found but no exanthem. If and when the evidence is as effective as is now the case for Brill's disease, the name "Rocky Mountain fever" should be discontinued and typhus should reign in its stead.

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THE PUBLIC HEALTH DEPARTMENT IN MEXICO CITY

F. P. MIRANDA, M. D.

Director, Interchange Office, Department of Health, Mexico City, Mexico

ON November 20, 1929, nineteen years after the initiation of the Mexican Revolution, President Emilio Portes-Gil dedicated the splendid new health department building erected in Mexico City as a symbol of the spirit of social betterment dominating the activities of our generation.

From the intense sufferings and hardships of the prolonged period of political agitation, new thoughts and inspirations have arisen, suggestive of redemption and even rebirth of a nation which has wonderful possibilities for the future.

Mexico represents the fusion of two civilizations and of two races. Following economic and social laws, the more advanced European civilization would either destroy the other or submit it to a domination which would practically amount to slavery. The Christian ideals and practices of the missionaries did much to smooth the practices of the "economic man" but notwithstanding, the great majority of the Indian population remained as a very low wage earning group, unable to raise its standards of life and to enjoy the benefits of a civilization which only tended to make it more miserable and hopeless.

The problem of public health in Mexico could not be solved as an independent problem. It had to be worked into a vast scheme of development mostly economic and educational. It was for this reason that the Mexican Constitution of 1917 converted the old Board of Health of Mexico City into a Federal Department with enlarged powers, placing under its jurisdiction all matters relating to transmissible diseases, aiming to end the incompetency and failure characteristic of local management.

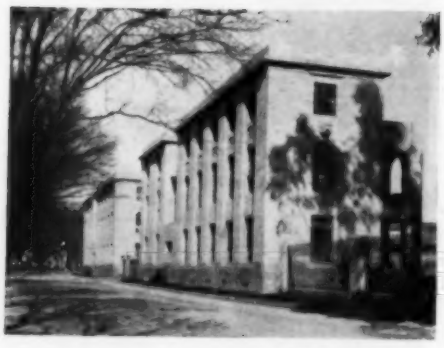
The enlargement of powers was slowly effected as the economic resources of the Federal Government developed. It was not until the years 1926–1927 that Federal Offices of Health were opened in all the States of the Union.

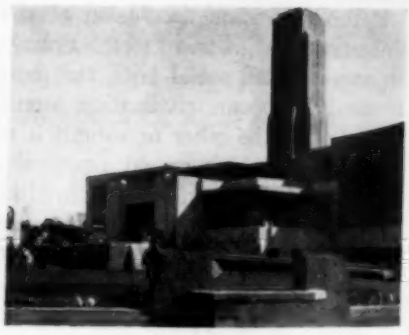
F. P. Miranda, M.D.

At this time a plan was evolved for the construction of a suitable building large enough to provide convenient quarters for the administrative and technical staff of the department.

Architect Carlos Obregón Santacilia was chosen by Dr. Bernardo J. Gastélum, who was at that time in charge of the Department, and work was begun immediately.

The architect had in mind an imposing building, worthy of the paramount importance that the affairs of public health have in this age, and from the artistic standpoint he sought to har-





Views of Headquarters of the Department of Health, Mexico City, Mexico

monize the severe and simple lines of the architecture of today with the models left to us from the old Aztec art.

As he himself said:

Ulises Valdez, M.D.
Secretary General, Department of Health

The arrangement of the building is that emanating from the needs and functions of each of the branches that form the Department of Health, and as to style, I made the only thing that could be made (we are in Mexico and in 1929), using the marvelous materials given by our soil, arranging the departments of the building as our climatological conditions demand, and combining the materials used with the natural simplicity of a functional organism . . . with architectural forms, which result from a constant purification, far from the influence of the old styles that have no reason to exist in our times and our surroundings and which could not agree with the needs of today; in this way, without the bounds of prejudice, I conceived a building in which the light and the air would be its chief ornaments and in which the arrangement of the departments would ease its functions. I have tried to evolve a Mexican style of our day, thinking as if our marvelous ancient civilization would not have been retained and as if our traditions would have continued uninterrupted until our day.

It may be well to explain to those unfamiliar with the climate of Mexico City the great importance of this basis in our architecture.

Mexico City is situated at an altitude of 7,350 feet above sea level. The air is correspondingly light, having a pressure of 585 mm. and a low conductive capacity for heat. This means that we depend more on the sun for our heating, and need a larger space for air. These facts together with the softness of our soil, that precludes the erection of any skyscrapers, are the reason for our preference for low-ample buildings provided with large courts or " patios " which admit air and sun as a basis for health. Fortunately our sun rarely hides itself beneath clouds or fogs, and thus we enjoy an exceptional, even climate all the year round without extremes of temperature.

The building may be divided into six masses composed of three floors each, two of which are central and four are lateral and all of them surrounding the " patio " in which the waters of a large fountain serve as a reflecting glass for the beauty of the structures.

The main central mass contains the head offices, and the back central lodge the central laboratories for analysis of foods and drugs.

The lateral masses are occupied by the departments which we call " Services," namely: Transmissible Diseases, Engineering, Foods, Drugs and Chemistry, Public Health Education, and Vital Statistics.

In addition, place was provided for our printing plant and library. A notable feature of the building is the mural decoration in the main council room. These representations of massive figures suggesting the ideal of hygiene were done by Sr. Diego Rivera.

Above the imposing stairways two stone sculptures, one of Dr. Eduardo Liceaga, a pioneer in hygiene, and a past president of the American Public

Views of Headquarters of the Department of Health, Mexico City, Mexico

Health Association, the other of Dr. Gaviño Iglesias, a pioneer in bacteriology, remind us of our past struggles and give us an inspiration for the future.

We sincerely hope that the visit of our American colleagues to this building may serve as a still further inspiration for our work and aims.

REAL WESTERN ENTERTAINMENT AT FORT WORTH CONVENTION

DR. TRUMAN TERRELL

Chairman, Entertainment Committee, Fort Worth, Texas

A GLIMPSE of the West of the olden days, the West that is so rapidly passing, will be offered to visitors to the American Public Health convention at Fort Worth. The features of this entertainment will be a real western rodeo, such as can be produced only in the ranch country, and an old-fashioned southern barbecue. Fort Worth, " where Golden West and Sunny Southland meet," is enabled to offer both.

The rodeo will be staged in the great coliseum on the grounds of the Southwestern Exposition and Fat Stock Show, where Fort Worth's big livestock show and rodeo are held each March. The barbecue will be served in one of the exposition buildings preceding the rodeo on the evening of Tuesday, October 28.

Buck Lucas, former world's champion all-round cowboy, will direct the rodeo. The performers will include a number of the best known rodeo stars in the world, among whom are Leonard Ward, Rube Roberts, Mike Hastings, Oklahoma Curly, Leonard Stroud, Warren Farmer, Indian Joe, Jim Massey, Buck Stewart and others. Women performers will include such stars as Fox Hastings, Tad Lucas, Ruth Roach and several others.

On the program there will be included exhibitions of bulldogging or steer wrestling, bronc and steer riding, fancy and trick riding, wild horse race, calf roping and fancy and trick roping.

To anyone not familiar with the performances offered by the great rodeo stars, the thrill of a lifetime is promised and even those who have seen the metropolitan versions of the rodeo will find a new thrill in the Fort Worth show.

Rodeo judges will include Captain Tom Hickman, famous captain of the Texas Rangers and one of the most noted peace officers in the country; Sheriff J. R. " Red " Wright, of Tarrant County; Chief Henry Lee, of the Fort Worth Police Department; and Guy L. Waggoner, eldest son of America's wealthiest cattleman.

Music will be furnished by the Texas Christian University Band of 60 pieces, and between the rodeo numbers special entertainment features will be provided, including an exhibition by " Red " Sublett and his trick mule. Transportation from hotels to the exposition grounds will be furnished free to all visitors.

The entertainment committee wishes to make it clear that this rodeo will be no " jump-up " performance, but will be a show in which a number of the world's greatest riders, ropers and steer wrestlers will appear. All of the performers are regular participants at the annual Exposition Rodeo in Fort Worth and it is their amazing skill and daring which attract tens of thousands of visitors to Fort Worth's great show each year, and bring them back, year after year.

AIR TRAVEL AND PUBLIC HEALTH

FREDERICK L. HOFFMAN, LL. D., F. A. P. H. A.

Consulting Statistician, The Prudential Insurance Company of America, Newark, N. J.

THE forthcoming meeting of the American Public Health Association at Fort Worth suggests to many of those participating the use of the airplane not only as a time saving convenience but as a means of study as to the relation of air travel to public health. In the light of thirty thousand miles of air travel I can personally bear witness to the beneficial results of air journeys not only in this country, but in Mexico, the West Indies, Canada, and Continental Europe.

The modern airplane, however, has introduced certain health hazards which cannot be treated lightly. Not only is it conceivable that infected persons are transported by means of airplanes, but transmissible diseases may otherwise be conveyed through infected insects, plants, etc. The sanitary supervision of air travel and the possibility of quarantine of air passengers and goods as yet has hardly received consideration, but the subject is one well worth studying.

In Europe air ambulances for the conveyance of sick persons have attracted considerable attention and were dealt with at the International Convention. The conveyance of doctors to isolated localities to give prompt treatment, as well as the transportation of medicine, particularly antitoxins, has been made a matter of record in a number of instances, but to me the main aspect of air travel is the beneficial results to passengers who derive great advantages from even a few hours of journeys in the upper air. Personally I have never met with any disadvantages, and the so-called risk of air sickness is largely exaggerated.

The questionnaires sent out to nearly a thousand registered pilots asking information as to the benefits of flying on health are almost uniformly in the affirmative. In not a single instance have the reports been to the effect that flying has been detrimental, regardless of the extraordinary strain on the nervous system on the part of pilots. Thus out of 895 replies returned, 713 were emphatically in the affirmative, while the remainder were neutral or ill defined. Out of the 895 only 40 reported having had air sickness, and these were mostly in connection with stunting performances.

It has been suggested that some of the members expecting to participate in the Fort Worth meeting may make use of the airplane for both rapid transportation and observational purposes. Dallas and Fort Worth are important air centers which can be easily reached by a number of lines. From Birmingham, Ala., the Delta Air Service makes the trip to Fort Worth in 2 days of about 4 hours flying each day at a cost of $46.00. This is a wonderful trip full of interesting views.*

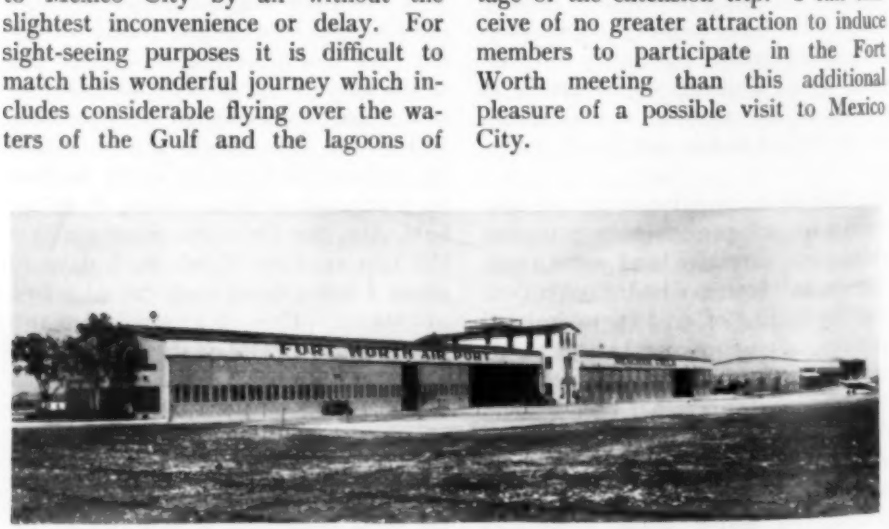
A short journey can be made from Tulsa, Okla., to Fort Worth, Tex., in about 4 hours at a cost of $17.00. But the main attraction is the opportunity of air trips to Mexico. These can be easily made from Fort Worth and Dallas

* For a more detailed article, see Stone and Webster, *Journal*, April, 1930, pp. 462–481.

over the Southern Air Transport Line, leaving Fort Worth at 8.55 in the morning, arriving at Brownsville at 3.45 in the afternoon, leaving Brownsville next day at 8.15 in the morning and arriving at Mexico City at 1.45 p.m. The air rate from Fort Worth to Brownsville is $28.44, while the rate from Brownsville to Mexico City is $87.50. These rates, of course, are higher than rail rates but the time saving is considerable. Thus the train leaves Mexico City at 8.50 p.m. and reaches Laredo, Tex., 34 hours later, while the air time is only 5½ hours including stopping time at Tampico.

No greater opportunity is likely to present itself for many years to members of the American Public Health Association to become familiar with the new spirit of Mexico in health and medical matters. Progress in Mexico during the last five or six years in this respect has been prodigious. It was but recently my privilege to attend the Latin-American Congress in Mexico City in connection with which I made the entire trip from Birmingham, Ala., to Mexico City by air without the slightest inconvenience or delay. For sight-seeing purposes it is difficult to match this wonderful journey which includes considerable flying over the waters of the Gulf and the lagoons of Southern Texas. The trip, of course, can easily be extended to other parts of Mexico, particularly Vera Cruz and Yucatan on the one hand, and Guatemala on the other. The rates, considering the enormous amount of saving in time, are not excessive or prohibitive.

Modern Mexico will astonish Americans who have never visited it. The developments in public health service during recent years have largely followed American lines of procedure. The new building of the Public Health Service of Mexico has nothing in America to outmatch it. The health officials are men of high standing in their profession, while everywhere one may meet physicians and surgeons of outstanding qualifications. There are some very admirable clinics in Mexico City worthy of a visit, while the historical attractions of the city and other parts of Mexico offer no end of opportunities, arousing the imagination and giving delight to the mind of searchers of the picturesque. I therefore hope that many of the visiting members of the American Public Health Association will be able to take advantage of the extension trip. I can conceive of no greater attraction to induce members to participate in the Fort Worth meeting than this additional pleasure of a possible visit to Mexico City.



Fort Worth Municipal Airport

ASSOCIATION NEWS

ORGANIZATION OF THE AMERICAN PUBLIC HEALTH ASSOCIATION

THE Constitution of the Association as amended by the Association at its Fifty-Eighth Annual Meeting and the new By-laws adopted by the Governing Council at that meeting included a number of changes calculated to simplify the organization of the society and to provide a scheme to permit better coördination of its many activities. The principal changes were:

1. Creation of the office of President-elect and the inclusion of this officer on the Executive Board in place of the retiring President
2. The creation of the new office of Chairman of the Executive Board
3. The election of 2 members of the Executive Board each year for a 3-year term in place of electing 3 new members each year for a 2-year term
4. The creation of 4 standing committees appointed by and responsible to the Executive Board, with a view to placing all of the Association's activities under the direction of these committees. It was expected also that these committees would afford a channel for coördinating the work of section committees with each other and with the work of the Association. The composition and functions of these committees are described on pages 866 and 867 of the August issue of the JOURNAL.

The new By-laws did not take away the authority of the Executive Board to appoint special committees from time to time, and under this authority the Board has appointed the following special committees:

Sedgwick Memorial Medal Committee
Committee on Federal Health Legislation
Committee to Extend the Association's Influence in South and Central Americas
Committee to Coöperate with the Director of the Census
Central Finance Committee
Executive Committee of Executive Board

The sections and section committees retain their previous independence under the new plan. However, to provide an opportunity for correlating the work of the sections with that of the Association, the section committees have been asked to report to one of the standing committees as well as to their respective sections.

Except for the fact that no appointment has been made to the office of secretary of the Committee on Research and Standards, the new organization has been completed as indicated by the diagram herewith presented.

The personnel of the Governing Council is shown on page XX of this issue of the JOURNAL. The personnel of the Executive Board and the standing committees follows:

Executive Board

W. S. Rankin, M.D. (1931), *Chairman*
E. L. Bishop, M.D. (1932)
A. J. Chesley, M.D. (1930)
Hugh S. Cumming, M.D. (1930)
Louis I. Dublin, Ph.D. (1930)
Haven Emerson, M.D. (1930)
William C. Hassler, M.D. (1930)
Matthias Nicoll, Jr., M.D. (1932)
Henry F. Vaughan, D.P.H. (1931)

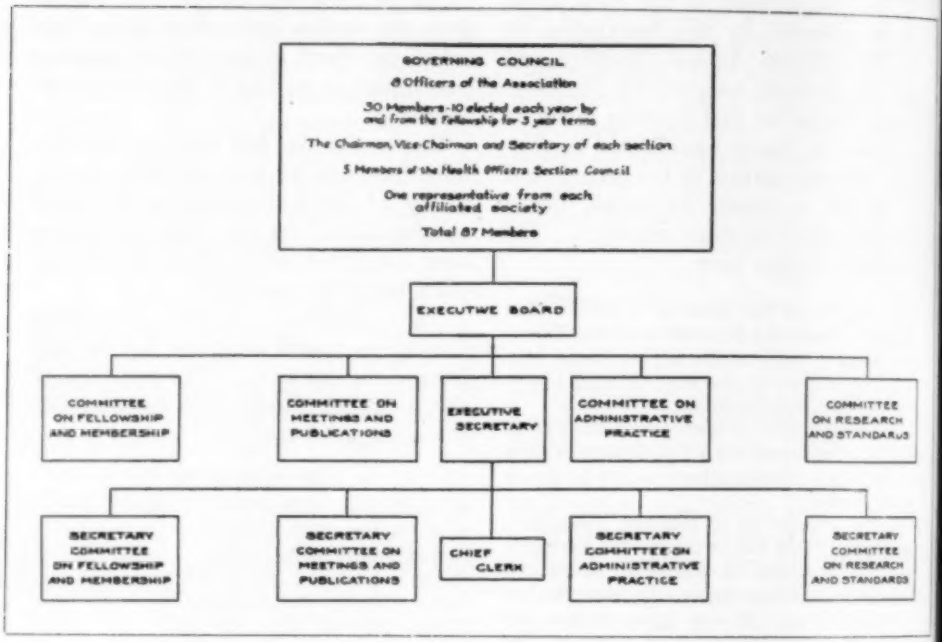
Homer N. Calver, *Executive Secretary*

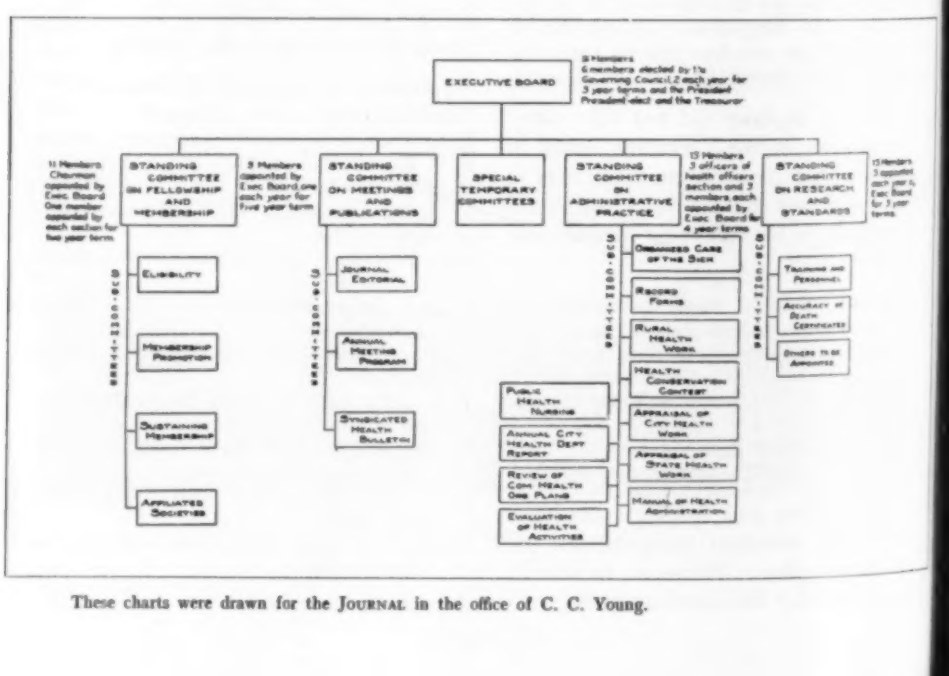
Committee on Fellowship and Membership

Sally Lucas Jean (1931), *Chairman*
B. L. Arms, M.D. (1930)—Laboratory Section
F. C. Blanck, Ph.D. (1930)—Food, Drugs and Nutrition Section
V. S. Cheney, M.D. (1931)—Industrial Hygiene Section
Alta E. Dines, R.N. (1931)—Public Health Nursing Section
Louis I. Dublin, Ph.D. (1931)—Vital Statistics Section
John A. Ferrell, M.D. (1930)—Epidemiology Section
E. L. Filby (1930)—Public Health Engineering Section
H. E. Kleinschmidt, M.D. (1930)—Public Health Education Section
J. H. Mason Knox, M.D. (1931)—Child Hygiene Section
George C. Ruhland, M.D. (1931)—Health Officers' Section

Cornelia Lyne, *Secretary*

ORGANIZATION
OF THE
AMERICAN PUBLIC HEALTH ASSOCIATION


GOVERNING COUNCIL
8 Officers of the Association
30 Members-10 elected each year by and from the Fellowship for 3 year terms
The Chairman, Vice-Chairman and Secretary of each section
5 Members of the Health Officers Section Council
One representative from each affiliated society
Total 87 Members
EXECUTIVE BOARD
COMMITTEE ON FELLOWSHIP AND MEMBERSHIP
COMMITTEE ON MEETINGS AND PUBLICATIONS
EXECUTIVE SECRETARY
COMMITTEE ON ADMINISTRATIVE PRACTICE
COMMITTEE ON RESEARCH AND STANDARDS
SECRETARY COMMITTEE ON FELLOWSHIP AND MEMBERSHIP
SECRETARY COMMITTEE ON MEETINGS AND PUBLICATIONS
CHIEF CLERK
SECRETARY COMMITTEE ON ADMINISTRATIVE PRACTICE
SECRETARY COMMITTEE ON RESEARCH AND STANDARDS



These charts were drawn for the JOURNAL in the office of C. C. Young.

Committee on Meetings and Publications

C. C. Young, D.P.H. (1933), *Chairman*
M. P. Ravenel, M.D. (1934)
C. F. Wilinsky, M.D. (1932)
W. P. Shepard, M.D. (1931)
John E. Monger, M.D. (1930)

Willimina M. Rayne, *Secretary*

Committee on Administrative Practice

C.-E. A. Winslow, Dr.P.H. (1933), *Chairman*
Haven Emerson, M.D. (1933)
Louis I. Dublin, Ph.D. (1933)
George C. Ruhland, M.D. (1932)
Henry F. Vaughan, D.P.H. (1932)
Allen W. Freeman, M.D. (1932)
Charles V. Chapin, M.D. (1931)
Sophie C. Nelson, R.N. (1931)
George T. Palmer, Dr.P.H. (1931)
Michael M. Davis, Ph.D. (1930)
W. S. Rankin, M.D. (1930)
George D. Lummis, M.D. (1930)
W. F. Draper, M.D.
E. L. Bishop, M.D.
John L. Rice, M.D.
} Officers of Health Officers' Section

W. F. Walker, Dr.P.H., *Secretary*

Committee on Research and Standards

Abel Wolman (1932), *Chairman*
Haven Emerson, M.D. (1932)
Edgar Sydenstricker (1932)
William H. Park, M.D. (1932)
Thomas Parran, Jr., M.D. (1932)
E. O. Jordan, Ph.D. (1931)
Wade H. Frost, M.D. (1931)
George W. Fuller (1931)
Henry C. Sherman (1931)
C. E. Turner (1931)
L. R. Thompson, M.D. (1930)
I. S. Falk, Ph.D. (1930)
Major A. Parker Hitchens (1930)

ANNUAL MEETING INFORMATION

Reduced Railroad Fares

REDUCED railroad fares on the Identification Certificate Plan have been authorized by the several Passenger Associations in the United States and Canada, which will entitle all members and dependent members of their families to a special rate of a fare and one-half for the round trip to Fort Worth.

Under this plan an Identification Certificate *must be presented* to the ticket agent when purchasing tickets. (One has been mailed to every member of the Association.) This is the ticket agent's authority to issue to delegates and dependent members of their families a round-trip ticket to Fort Worth at the reduced rate. The routing should be specified when making the purchase, for the routing covered by the round-trip ticket cannot be changed at Fort Worth.

All return tickets must be validated, before leaving Fort Worth, by the ticket agent who will be on hand at the Registration Desk in the Hotel Texas, or by the regular ticket office.

It is suggested that all members consult their local ticket agents in regard to dates of sale and return limit of reduced-rate tickets, as these limits vary according to distance from Fort Worth.

The Passenger Associations have authorized a special rate of fare and three-fifths for delegates who are taking the post-convention tour to Mexico City. They should purchase tickets with return limit 30 days from date of sale.

Either fare and one-half or fare and three-fifths should be specified when purchasing tickets, depending upon whether or not the delegate returns immediately from Fort Worth or goes on to Mexico City.

Special Trains to Fort Worth

ARRANGEMENTS have been made for delegates to Fort Worth to travel together in special trains or through cars from various points in the United States. St. Louis, Memphis, New Orleans, Portland, and Los Angeles have been selected as concentration points. A communication has been sent to the membership setting forth the advantages of such travel, and maps showing special train movements and schedules for special cars are repeated here for the sake of convenience. (See pages 1134, 1135 and 1136.)

SCHEDULES FOR SPECIAL CARS TO THE ANNUAL MEETING

LOUISVILLE, KY., NASHVILLE, TENN., DELEGATES
CONCENTRATION POINT, MEMPHIS, TENN.

Lv. Louisville, Ky.	L. & N.	No. 99	Sat.	Oct. 25	12:47 P.M.
Ar. Memphis, Tenn.	L. & N.	No. 99	Sat.	Oct. 25	10:00 P.M.
Lv. Nashville, Tenn.	N. C. & St. L.	No. 6	Sat.	Oct. 25	2:45 P.M.
Ar. Memphis, Tenn.	N. C. & St. L.	No. 6	Sat.	Oct. 25	9:00 P.M.
Lv. Memphis, Tenn.	St. L. S. W.	No. 11	Sat.	Oct. 25	10:30 P.M.
Ar. Fort Worth, Tex.	St. L. S. W.	No. 11	Sun.	Oct. 26	1:55 P.M.

JACKSONVILLE, ATLANTA, BIRMINGHAM, MONTGOMERY, NEW ORLEANS, HOUSTON DELEGATES
CONCENTRATION POINT, NEW ORLEANS

Lv. Jacksonville, Fla.	S. A. L.–L. & N.	No. 3–2	Sat.	Oct. 25	9:45 A.M.
Ar. New Orleans, La.	S. A. L.–L. & N.	No. 3–2	Sun.	Oct. 26	6:50 A.M.
Lv. Atlanta, Ga.	A. W. P.–L. & N.	No. 37	Sat.	Oct. 25	6:05 P.M.
Ar. New Orleans, La.	A. W. P.–L. & N.	No. 37	Sun.	Oct. 26	8:30 A.M.
Lv. Birmingham, Ala.	L. & N.	No. 99	Sat.	Oct. 25	10:02 P.M.
Ar. New Orleans, La.	L. & N.	No. 99	Sun.	Oct. 26	9:05 A.M.
Lv. Montgomery, Ala.	L. & N.	No. 99	Sun.	Oct. 26	12:25 A.M.
Ar. New Orleans, La.	L. & N.	No. 99	Sun.	Oct. 26	9:05 A.M.
Lv. New Orleans, La.	Sou. Pac.	No. 101	Sun.	Oct. 26	10:40 A.M.
Ar. Houston, Tex.	Sou. Pac.	No. 101	Sun.	Oct. 26	8:45 P.M.
Lv. Houston, Tex.	M. K. & T.	No. 10	Sun.	Oct. 26	11:00 P.M.
Ar. Fort Worth, Tex.	M. K. & T.	No. 10	Mon.	Oct. 27	7:59 A.M.

VANCOUVER, EVERETT, SEATTLE, TACOMA, SPOKANE, PORTLAND, AND PACIFIC NORTHWEST DELEGATES
CONCENTRATION POINT, PORTLAND, ORE.

Lv. Vancouver, B. C.	Grt. Nor.	No. 357	Wed.	Oct. 22	11:59 P.M.
Ar. Seattle, Wash.	Grt. Nor.	No. 357	Thur.	Oct. 23	7:00 A.M.
Lv. Everett, Wash.	Grt. Nor.	No. 1	Thur.	Oct. 23	7:58 A.M.
Ar. Seattle, Wash.	Grt. Nor.	No. 1	Thur.	Oct. 23	9:00 A.M.
Lv. Seattle, Wash.	Grt. Nor.	No. 562	Thur.	Oct. 23	11:10 A.M.
Lv. Tacoma, Wash.	Grt. Nor.	No. 562	Thur.	Oct. 23	12:35 P.M.
Ar. Portland, Ore.	Grt. Nor.	No. 562	Thur.	Oct. 23	5:10 P.M.
Lv. Spokane, Wash.	S. P. & S.	No. 1	Wed.	Oct. 22	10:15 P.M.
Ar. Portland, Ore.	S. P. & S.	No. 1	Thur.	Oct. 23	9:00 A.M.
Lv. Portland, Ore.	Sou. Pac.	No. 15–60	Thur.	Oct. 23	6:15 P.M.
Lv. Salem, Ore.	Sou. Pac.	No. 15–60	Thur.	Oct. 23	8:20 P.M.
Lv. Eugene, Ore.	Sou. Pac.	No. 15–60	Thur.	Oct. 23	10:30 P.M.
Lv. Klamath Falls, Ore.	Sou. Pac.	No. 15–60	Fri.	Oct. 24	4:52 A.M.
Lv. Davis, Calif.	Sou. Pac.	No. 15–60	Fri.	Oct. 24	4:25 P.M.
Lv. Sacramento, Calif.	Sou. Pac.	No. 15–60	Fri.	Oct. 24	5:30 P.M.
Lv. Stockton, Calif.	Sou. Pac.	No. 15–60	Fri.	Oct. 24	7:03 P.M.
Ar. Fresno, Calif.	Sou. Pac.	No. 15–60	Fri.	Oct. 24	10:35 P.M.
Lv. Glendale, Calif.	Sou. Pac.	No. 15–60	Sat.	Oct. 25	8:02 A.M.
Ar. Los Angeles, Calif.	Sou. Pac.	No. 15–60	Sat.	Oct. 25	8:30 A.M.

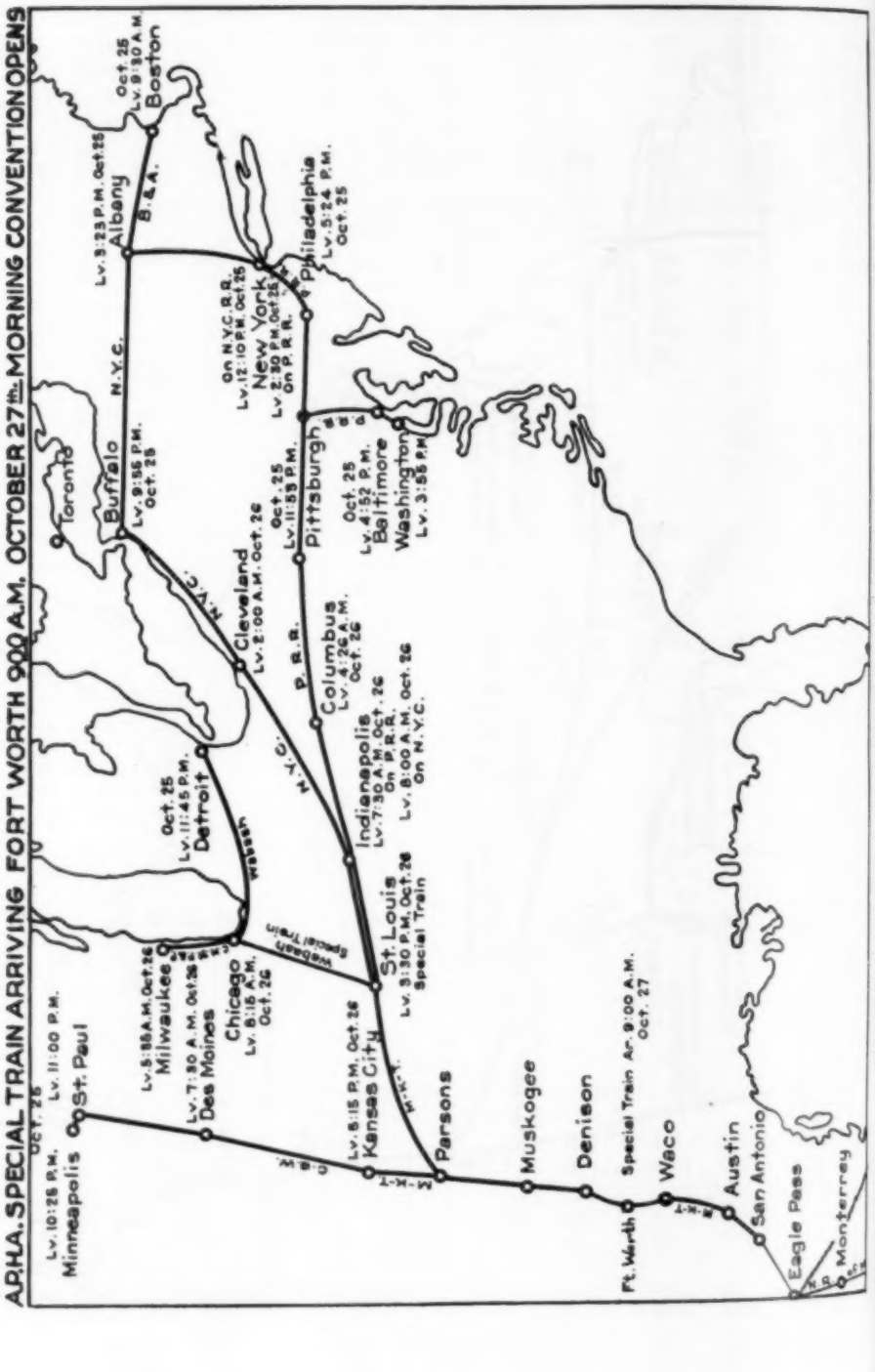
OAKLAND, SAN FRANCISCO, SAN JOSE, DEL MONTE, SANTA BARBARA, SAN DIEGO DELEGATES
CONCENTRATION POINT, LOS ANGELES

Lv. Oakland, Calif.	Sou. Pac.	No. 26	Fri.	Oct. 24	6:31 P.M.
Ar. Los Angeles, Calif.	Sou. Pac.	No. 26	Sat.	Oct. 25	8:40 A.M.
Lv. San Francisco, Calif.	Sou. Pac.	No. 102	Fri.	Oct. 24	6:15 P.M.
Lv. San Jose, Calif.	Sou. Pac.	No. 102	Fri.	Oct. 24	7:30 P.M.
Lv. Del Monte, Calif.	Sou. Pac.	No. 207	Fri.	Oct. 24	8:30 P.M.
Ar. Los Angeles, Calif.	Sou. Pac.	No. 102	Sat.	Oct. 25	8:15 A.M.
Lv. Santa Barbara, Calif.	Sou. Pac.	No. 76	Sat.	Oct. 25	6:10 A.M.
Ar. Los Angeles, Calif.	Sou. Pac.	No. 76	Sat.	Oct. 25	9:30 A.M.
Lv. San Diego, Calif.	A. T. & S. Fe	No. 79	Sat.	Oct. 25	2:10 A.M.
Ar. Los Angeles, Calif.	A. T. & S. Fe	No. 79	Sat.	Oct. 25	7:30 A.M.

(Sleeping Cars Ready for Occupancy at 9:45 P.M.)

OCTOBER 27–30, 1930
A.P.H.A. SPECIAL TRAIN ARRIVING FORT WORTH 12:40 P.M. OCTOBER 26TH DAY BEFORE CONVENTION

A.P.H.A. SPECIAL TRAIN ARRIVING FORT WORTH 12 40 P.M. OCTOBER 26th DAY BEFORE CONVENTION
OCTOBER 27–30, 1930
Lv. 10:25 P.M. Oct. 24
Minneapolis
Lv. 11:00 P.M.
St. Paul
Lv. 8:00 A.M. Oct. 25
Milwaukee
Lv. 7:30 A.M. Oct. 25
Des Moines
Lv. 11:30 A.M. Oct. 25
Chicago
Wabash Special Train
Lv. 11:45 P.M. Oct. 24
Detroit
Lv. 10:10 P.M. Oct. 25
Kansas City
M-K-T
Toronto
Buffalo
Lv. 12:30 A.M. Oct. 25
N.Y.C.
Cleveland
Lv. 7:10 A.M. Oct. 25
N.Y.C.
P.R.R.
Columbus
Lv. 9:03 A.M. Oct. 25
Indianapolis
Lv. 12:06 P.M. Oct. 25
On P.R.R.
St. Louis
Lv. 6:30 P.M. Oct. 25
Special Train
Lv. 11:55 A.M. Oct. 25
On N.Y.C.
Pittsburgh
Oct. 25
Lv. 4:33 A.M.
Albany
Oct. 24
Lv. 9:27 P.M.
B & A
Boston
Oct. 24
Lv. 3:40 P.M.
On N.Y.C.R.R.
Lv. 6:20 P.M. Oct. 24
New York
Lv. 7:05 P.M. Oct. 24
On P.R.R.
Philadelphia
Lv. 8:50 P.M. Oct. 24
Lv. 8:19 P.M. Oct. 24
Baltimore
Washington
Lv. 7:20 P.M. Oct. 24
Parsons
Muskogee
Denison
Special Train Ar. 12:40 P.M. Oct. 26
Ft. Worth
Waco
M-K-T
Austin
San Antonio
Eagle Pass
M.P. To
Monterrey


A.P.H.A. SPECIAL TRAIN ARRIVING FORT WORTH 9:00 A.M. OCTOBER 27th MORNING CONVENTION OPENS
Lv. 10:25 P.M. Oct. 25
Minneapolis
Lv. 11:00 P.M.
St. Paul
Lv. 5:55 A.M. Oct. 26
Milwaukee
Lv. 7:30 A.M. Oct. 26
Des Moines
Chicago
Lv. 8:15 A.M. Oct. 26
Lv. 11:45 P.M. Oct. 25
Detroit
Wabash
Wabash Special Train
Lv. 5:15 P.M. Oct. 25
Kansas City
Lv. 3:30 P.M. Oct. 26
Special Train
St. Louis
Lv. 7:30 A.M. Oct. 26
On P.R.R.
Indianapolis
Lv. 8:00 A.M. Oct. 26
On N.Y.C.
Lv. 2:00 A.M. Oct. 26
Cleveland
Lv. 4:26 A.M. Oct. 26
Columbus
Lv. 11:55 P.M. Oct. 25
Pittsburgh
Lv. 4:52 P.M. Oct. 25
Baltimore
Lv. 3:55 P.M.
Washington
Lv. 5:24 P.M. Oct. 25
Philadelphia
On N.Y.C.R.R. Lv. 12:10 P.M. Oct. 25
On P.R.R. Lv. 2:30 P.M. Oct. 25
New York
Lv. 3:23 P.M. Oct. 25
Albany
Lv. 9:30 A.M. Oct. 25
Boston
Lv. 9:55 P.M. Oct. 25
Buffalo
Toronto
Parsons
Muskogee
Denison
Special Train Ar. 9:00 A.M. Oct. 27
Ft. Worth
Waco
Austin
San Antonio
Eagle Pass
Monterrey

AMENDMENT TO THE CONSTITUTION

IN accordance with the provision in the Constitution regarding amendments, the following amendment, which is to be offered at the forthcoming Annual Meeting, is hereby published as prescribed.

RESOLVED that Article III, Section A, of the Constitution, shall be amended by the addition of the following at the end of this section:

6. A representative to be designated by each regional branch. Such representative shall be a Fellow of the American Public Health Association.

This amendment, if approved by the Governing Council, will be presented to the Fellows present at the Fort Worth meeting. It requires a two-thirds vote of the Fellows present and voting, for ratification.

NEW MEMBERS

Health Officers Section

Otis L. Chason, M.D., Opelika, Ala., County Health Officer, Lee County

Gustav J. Hildebrand, M.D., Sheboygan, Wis., Health Officer

W. S. Hull, M.D., St. Joseph, Mo., County Health Officer

Thomas H. Johnston, M.D., Athens, Ga., Commissioner of Health

Dr. Walter Kleberg, Galveston, Tex., City Health Officer

W. F. Lunsford, M.D., Poteau, Okla., Director, LeFlore County Coöperative Health Unit

Alexander C. McKean, M.D., Provo, Utah, Director, Utah County Health Unit

W. M. Newman, M.D., Spokane, Wash., County Health Officer

Zenas V. D. Orton, M.D., Salem, N. Y., Health Officer

J. W. Pittman, M.D., Belton, Tex., County Health Officer

William Plattner, Brattleboro, Vt., Health Officer

Josiah B. Redfield, M.D., North Platte, Nebr., City Physician

Luther F. Rhodes, M.D., Fort Worth, Tex., County Physician

Dr. Hugo Robinson, Albany, Ga., Commissioner of Health

William V. Sanford, M.D., Murfreesboro, Tenn., Assistant Director, Rutherford County Health Department

George H. Spivey, M.D., Wink, Tex., Director, Winkler County Health Unit

Laboratory Section

Helene T. Bennett, A.M., Yuma, Ariz., Director of Clinical Laboratory, Thomas Laboratories

E. H. Bramhall, B.S., Salt Lake City, Utah, Director, State Board of Health Laboratory

Clarence R. DeYoung, B.S., Chicago, Ill., Senior Bacteriologist, Department of Health

Hugh N. Heffernan, B.S., New Orleans, La., Field Bacteriologist, State Board of Health

Archie H. Robertson, Ph.D., Albany, N. Y., Director, Food Laboratory, State Department of Agriculture and Markets

Richard F. Zedlitz, D.V.M., Ballinger, Tex., City Milk Inspector

Public Health Engineering Section

Aaron D. Chandler, Fort Worth, Tex., Chief Plumbing Inspector, Engineering Department

O. K. Hobbs, Abilene, Tex., City Engineer

Leonard H. Male, Salt Lake City, Utah, State Sanitary Engineer

M. S. Kumaraswamy Pillay, Trivandrum, India, Section Officer, Water Works (Assoc.)

John R. Hoy, Jacksonville, Fla., Sanitary Engineer, Wallace & Tiernan Co.

G. T. Russell, Lufkin, Tex., Superintendent, City Water Works

Food, Drugs and Nutrition Section

Leo F. Barthelme, B.V.S., Parsons, Kans., Milk and Dairy Inspector

Child Hygiene Section

James J. Waring, M.D., Denver, Colo. (Assoc.)

Public Health Education Section

John H. Burleson, San Antonio, Tex., recently Chairman, Board of Health

William J. Johnson, M.D., San Antonio, Tex., Superintendent, State Hospital

Vera H. Jones, M.D., Denver, Colo., School Physician

Merl L. Pindell, M.D., Los Angeles, Calif., Consultant in Tuberculosis, Los Angeles County Health Department

Mrs. Joseph L. Smith, New York, N. Y., Division Chairman, Indian Welfare, General Federation of Women's Clubs

Sigrid Thorsen, San Jose, Calif., Public Health Nurse

Susan M. Wood, New York, N. Y., Executive Secretary, New York City Cancer Committee

Public Health Nursing Section

Olive A. Alling, Brooklyn, N. Y., on staff, Jewish Hospital School of Nursing

Martha H. Bredemeier, R.N., Sweetwater, Tex., Public Health Nurse, Nolan County Health Unit

Ada P. Coleman, Grand Rapids, Mich., Director, Visiting Nurse Association

K. M. Hudson, R.N., Salt Lake City, Utah, Executive Director, Visiting Nurse Association

Mrs. Emma S. Land, Henderson, Tenn., Division of Tuberculosis Control, Nursing, State Department of Health

Emma B. Litwiller, R.N., Ann Arbor, Mich., Student (Assoc.)

Ruth M. McCullagh, B.S., Quincy, Calif., Health Supervisor, Plumas County Schools

June P. Peck, Reedley, Calif. (Assoc.)

Epidemiology Section

Jesse C. Ellington, M.D., Kingsport, Tenn., Associate Epidemiologist, State Department of Health

Unaffiliated

Eusebio D. Aguilar, M.D., Manila, P. I., Senior Medical Inspector, Philippine Health Service

Henry M. Bracken, Claremont, Calif., Editor, Health Department, *Western Hospital Review*

Frank S. Bright, Washington, D. C. (Assoc.)

Robert A. Cooley, Bozeman, Mont., Rocky Mountain Spotted Fever

Charles C. Gidney, M.D., Plainview, Tex. (Assoc.)

Clarence C. Little, LL.D., Bar Harbor, Me., Managing Director, American Society for Control of Cancer

Charles Maertz, M.D., Cincinnati, O. (Assoc.)

J. Leonard McDonald, M.D., Cragmor, Colo. (Assoc.)

Garland H. Pace, Salt Lake City, Utah (Assoc.)

DECEASED MEMBERS

Kenneth Allen, New York, N. Y., Elected Member 1915, Fellow 1922

Charles O'H. Laughinghouse, M.D., Raleigh, N. C., Elected Member 1920

George Collins, Raleigh, N. C., Elected Member 1928

Charles P. Fox, M.Sc., Miamisburg, O., Elected Member 1919

George C. Gensheimer, Erie, Pa., Elected Member 1919

Carson V. Merritt, M.D., Flint, Mich., Elected Member 1923

Fowler A. Watters, M.D., Lockport, N. Y., Elected Member 1927

APPLICANTS FOR FELLOWSHIP

HEALTH OFFICERS: Benjamin Goldberg, M.D., Chicago, Ill.; Eugene H. Sullivan, Nutley, N. J.; F. Edward Whitehead, Morristown, N. J.

FOOD, DRUGS AND NUTRITION: Joseph Parke Bushong, M.D., Los Angeles, Calif.

CHILD HYGIENE: Pauline B. Williamson, New York, N. Y.

INDUSTRIAL HYGIENE: Daniel L. Lynch, M.D., Boston, Mass.

PUBLIC HEALTH ENGINEERING: Ralph E. Tarbett, Washington, D. C.

CORRECTIONS

Edward Desmond Hopkins, Fort Worth, Tex., listed in the September JOURNAL as Unaffiliated, has since applied for fellowship in the Public Health Engineering Section of the Association.

The name of Charles Frederick Adams was published in the September JOURNAL as Charles Henry Adams.

MEMBERSHIP LIST

Publication of the List of Members of the A. P. H. A. has been delayed. Announcement of date of publication will be made in November JOURNAL.

PUBLIC HEALTH ADMINISTRATION

HENRY F. VAUGHAN, D. P. H.

Decrease of Hookworm—Hookworm infection is still widespread geographically in the southern states. The Pythagoristic standardization of carriers versus patients predicated on hookworm biology and used as a basis in the very interesting studies conducted in Alabama should be restudied and checked, both from the standpoint of objective and subjective, measurable and unmeasurable factors, and until fully confirmed should not be taken as justifying health officers in assuming a position that light cases of hookworm infection are to be ignored clinically or to be discouraged from or prejudiced against treatment. County health officers should establish their hookworm eradication programs through the agency of the family physician who should give the treatments. Education should function through schools, churches, industries, and public health nurses.—C. W. Stiles, Decrease of Hookworm Disease in the United States, *Pub. Health Rep.*, 45, 1763 (Aug. 1), 1930.

Influenza in Cleveland—There were reported 5,922 cases of influenza in Cleveland during the 2 months, December and January, 1928–1929, and 315 deaths due to this cause. It is estimated that 17,300 cases of influenza occurred. As compared with the winter months of the 5 preceding years, the winter of 1928–1929 had an excess of 42 per cent in total deaths. Beyond the age of 5 years the fatality rate increased with age. The highest case rates occurred in the congested parts of the city. The peak of incidence in 16 of the 18 districts into which the city was divided occurred in the week of December 23. In the other two districts the peak occurred in the preceding week. Secondary peaks occurred in five districts, all in the southeastern part of the city. All the secondary peaks occurred in the week of January 6.—H. W. Green and H. L. Rockwood, The 1928–1929 Influenza Epidemic in Cleveland, *J. Prev. Med.*, 4, 251 (July), 1930.

Diphtheria Prevention in Philadelphia—In June, 1930, the third annual campaign for immunization against diphtheria was conducted. It is estimated that 70 per cent of the public school population and 60 per cent of the parochial school children have been protected with a resulting decrease of 50 per cent in the incidence of this disease. There were established in June 98 points where toxin-antitoxin was administered free to 23,000 children. Publicity was given through circulars and campaign literature, news articles and advertisements in the daily papers, radio announcements, posters in street cars, buses and taxicabs and notices on billboards in various parts of the city.—H. L. Hartley, Campaign for Immunization against Diphtheria, *Bulletin* Philadelphia Health Dept., Aug., 1930.

Morbidity Area—The following suggestions have been made as criterions in determining the admissibility to the proposed morbidity reporting area of states having 500,000 or more population:

1. The state shall be in the registration areas for births and deaths.

2. The state shall have a morbidity reporting law or regulations requiring—A. An immediate report to the local health officer of each case of diphtheria, infantile paralysis, measles,

smallpox, scarlet fever, typhoid fever, tuberculosis, whooping cough, giving name, age, sex, and address. B. (1) A daily report by the local health officer to the State Health Department of each case reported to him, giving the above details of name, age, sex and address. (2) A report at least once weekly of the total cases of each disease reported during the preceding week, and a monthly summary of each disease by age and sex.

3. A check made each month on the deaths from the above mentioned diseases to ascertain whether or not they have previously been reported as cases.

4. The state shall attain a suitable fatality rate for diphtheria, measles, scarlet fever, typhoid fever, and whooping cough.—

R. C. Williams, The Proposed Morbidity Reporting Area, *Pub. Health Rep.*, 45, 1781 (Aug. 1), 1930.

LABORATORY

C. C. YOUNG, D. P. H.

A SIMPLE METHOD FOR INDICATING THE VARIOUS SUGARS USED IN THE CARBOHYDRATE SERIES

R. V. STONE, D. V. M.

Director, Bureau of Laboratories, Los Angeles County Health Department, Los Angeles, Calif.

IN the past, laboratories have resorted to various methods of marking test tubes containing various carbohydrates for identification of organisms through their fermentative reactions. Two methods commonly in practice consisted of actually labelling the test tubes with frosted numbers indicating the sugars, or of coloring the cotton stoppers with aniline dyes, using a different color for each carbohydrate. Both methods were objectionable since either the test tubes had to be carefully sorted for the sugar they were to contain, or the dye on the stoppers was frequently transferred to the worker's fingers. The method of marking each tube with a wax pencil is the most common. It has the objection of consuming considerable time, and involving considerable processing in cleaning the tubes.

The Bureau of Laboratories of the Los Angeles County Health Department has for some time had in use a simple scheme developed by the writer. Glass beads commercially designated as "No. 2, cut beads" can be obtained in a variety of colors. The most practical series of colors are: red, opal, amber, light blue, black and dark green. A color is assigned to each sugar and used throughout the laboratories. Red beads indicate dextrose; amber mannite; opal maltose; blue lactose; black saccharose; and dark green plain broth.

It is a simple matter, in use, to recognize the sugar by the color of the bead. The identification charts which give the reactions of various organisms with sugars are marked at the top in colors similar to those of the beads. The sugar series is taken from the rack after incubation and the beads quickly matched with the same colors on the chart. Recording of reactions is rapidly made.

When washing the tubes after the tests the broth is emptied through a sieve and the beads collected are rapidly sorted according to their colors and are ready for use in the next batch of medium.

A STORAGE BIN FOR LABORATORY GLASSWARE

C. S. MUDGE, F. A. P. H. A.

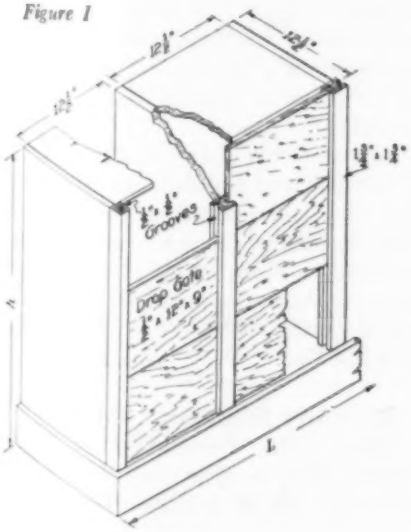
Associate Bacteriologist, Division of Dairy Industry, University of California College of Agriculture, Davis, Calif.

DUE to the reorganization of the service room in the bacteriological laboratory of this institution, overcrowding was imminent, which was solved by the installation of storage bins described below.

The measurements were based on the size of petri dishes, but other glassware has been found to fit nicely into the space. A series of upright partitions was erected, upon the outside edge of which were fastened strips of lumber—1¾" x 1¾"—ruled out as shown in Figure I. Gates or slides were made to fit into these grooves.

Petri dishes were placed on the floor of the bin—three each way—and other dishes were piled upon these, a slide being inserted as the pile grew. Thus, it was possible to receive and dispense petri dishes, always having them easily accessible. Although in one of the bins the dishes are 80 high, no breakage has been noticed due to the weight of the superimposed glassware.

Figure I



For dilution bottles we have found these bins convenient. In this case each layer has been separated from the one above by egg case flats.

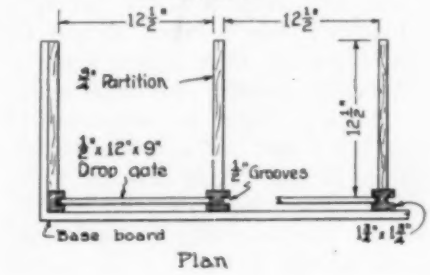
One and two liter flasks have been stowed successfully by inverting some of the flasks between the upright ones.

Although the height of these bins may be varied, those in this laboratory are 7′ high, which has proved entirely satisfactory.

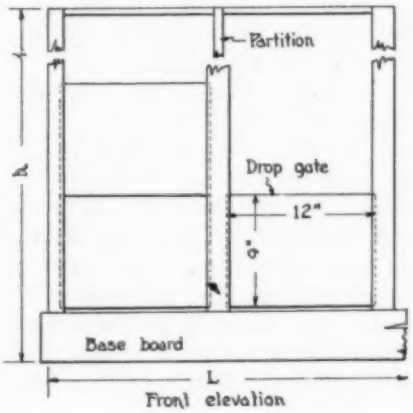
In teaching laboratories, where at times large numbers of dishes and flasks are issued for exercises, it has been found that the flexibility of this method of storage is a great help.

Figure II is given to show the plan of the bin.

Figure II



Plan



Front elevation

VITAL STATISTICS

LOUIS I. DUBLIN, PH. D.

Appendicitis Mortality—In the 19 years since 1911 a steady upward trend in appendicitis mortality rates has been observed among Metropolitan policy holders. The year 1929 had one of the highest appendicitis death rates on record. Comparing the first 5 with the last 5 years of this 19-year period, we find an increase of 20 per cent in the death rate for white males and of 14 per cent for white females.

The increases in fatalities have varied by age. For children under 5 years, the appendicitis death rate in 1925–1929 was 11.5 per 100,000 for white males, an increase of 126 per cent since 1911–1915. For white females, the recent death rate at this age period was 9.2 per 100,000, an increase of 92 per cent since 1911–1915. Only between 10 and 19 years of age was there any decrease in appendicitis mortality for both males and females. Here the decrease was about 3 per cent for white males and between 10 and 15 per cent for white females. Beginning with adult life, however, the appendicitis death rate showed marked increases in the period 1925–1929, as compared with 1911–1915. During adult life it was generally true that the higher the age the greater the rise in mortality.

In general, appendicitis mortality among males is higher than that of females. In 1911–1915, the death rate of males exceeded that of females by 26 per cent. In 1925–1929, in view of the greater increases in mortality among males than among females, the excess in the death rate of males had risen to 33 per cent. As measured by these data, the disease seems not to be equally common in males and females, as has been suggested in standard texts on the subject.

Much of the recorded increase in appendicitis mortality in recent years seems to be real and is not due in large part to greater precision in reporting. Beginning with 1911 great care has been exercised in securing more complete statements of the causes of death from physicians and surgeons. It is believed that the statistics included in this survey are as nearly complete as such data ever will be. Hence, the recorded increase in appendicitis mortality among these policy holders must reflect, by and large, a real change in the factors leading to fatal appendicitis. At the present time we do not know what those factors are.

In former years, it was assumed that high appendicitis rates prevailed in years characterized by high prevalence of general intestinal infections. The sharp fall of death rates for diarrhea and enteritis since 1911, resulting from the protection of milk, and other food supplies, suggests, however, that food infections of the kind prevailing years ago were not a primary factor in bringing on the recent increase in appendicitis mortality.

The subject is of sufficient importance to warrant well founded and critical inquiry into the prevailing and indisputably increasing incidence of fatal appendicitis. More than 18,000 deaths from the disease occurred in the United States during 1928.—*Stat. Bull.*, Met. Life Ins. Co., 1: 1–3 (July), 1930.

Mortality Statistics. 1929—

Maine—The Department of Commerce announces that there were 11,353 deaths in Maine during 1929 as com-

pared with 11,005 in 1928. The number of deaths (523) from influenza in 1929 was almost double the number (278) which occurred in 1928, and this increase was mainly responsible for the increase in the total number of deaths which occurred during the year 1929, as compared with 1928. The number of deaths (2,189) due to diseases of the heart represents the largest number for the 4-year period. Cancer, with 1,120 deaths, also showed a continuous increase. The increase in the number of deaths from diarrhea and enteritis in children under 2 years of age was especially noticeable in the 2 years, 1928 and 1929.

Most significant among the decreases in deaths were those due to nephritis (877 to 825), and cerebral hemorrhage and softening (1,134 to 1,090). Decreases were also reported for a number of the epidemic and infectious diseases, including diphtheria, scarlet fever, typhoid fever, whooping cough and others. None of these, however, was responsible for an appreciable number of deaths in the state.

The number of deaths from accidental and unspecified external causes decreased from 638 in 1928 to 585 in 1929. Especially noteworthy was the decrease in the number of drownings from 114 to 81. This decrease, however, was more than offset by the large increase from 115 to 151 in the number of deaths due to automobile accidents and an increase of 20 in the number of suicides.

Montana—There were 5,742 deaths in Montana during 1929 as compared with 5,780 in 1928.

The numbers of deaths from influenza in 1928 and 1929 greatly exceeded the number from this disease in 1927 and were in a considerable measure responsible for the increase in the total number of deaths in this state for the latter years. There was an increase each succeeding year reported from cancer and other malignant tumors, diseases of the heart, appendicitis and typhlitis, and a few other less important causes of death.

Other increases were from measles, 8 to 50, typhoid and paratyphoid fever, from 16 to 31, and puerperal septicemia, from 28 to 42. The number of deaths from tuberculosis was less than for any previous year shown in the table, and noteworthy decreases were reported in the number of deaths from cerebral hemorrhage and softening and diabetes mellitus.

The number of deaths due to accidental and unspecified external causes was practically the same as in prior years, but for the years 1928 and 1929 there was a considerable increase in the number of deaths due to automobile accidents, as compared with the years 1926 and 1927.

Nevada—Nevada reports 1,199 deaths in 1929—the first year of its admission to the registration area.

The principal causes of death in order of their importance were diseases of the heart, 165; pneumonia, all forms, 98; tuberculosis, all forms, 87; cancer, 80; and nephritis, 72.

Of the deaths due to accidental and unspecified external causes, the greatest number was caused by automobile accidents, with 45, mine accidents second, with 15, and railroad accidents and accidental falls having the same number of 14 each.

North Dakota—There were 5,421 deaths in North Dakota during 1929 as compared with 5,513 in 1928.

The same 5 causes of death ranked the highest during the 4 years 1926 to 1929; in 1929 they were in the following order: diseases of the heart (796), congenital malformations and diseases of early infancy (486), cancer (457), pneumonia, all forms (424), and cerebral hemorrhage and softening (420). Other causes which were among the next highest during this period were nephritis, influenza, and tuberculosis, all

forms. The deaths from diseases of the heart, pneumonia, all forms, and influenza in 1928 and 1929, greatly exceeded those in 1927, while the deaths from tuberculosis were noticeably fewer.

In 1929 marked increases from 1928 were reported in deaths from measles, meningococcus meningitis, diphtheria, whooping cough, and diarrhea and enteritis, under 2 years; decreases in deaths were shown for diabetes mellitus, scarlet fever, and acute anterior poliomyelitis.

The greatest number of deaths in 1929 from accidental and unspecified external causes was due to automobile accidents (88 as compared with 79 in 1928), followed by accidental falls and accidental drowning.

Wisconsin—The Department of Commerce announces that there were 31,287 deaths in Wisconsin during 1929 as compared with 31,788 in 1928.

Deaths from measles increased from 12 in 1928 to 86 in 1929, and from whooping cough from 79 to 121, but even these large numbers in 1929 compare favorably with the very much larger ones in 1926 (154 and 175, respectively).

The deaths from diseases of the heart and cerebral hemorrhage and softening increased steadily and considerably in each year from 1926 to 1929, but, on the other hand, deaths from diphtheria, tuberculosis, all forms, diarrhea and enteritis, under 2 years, and congenital malformations and diseases of early infancy decreased, similarly, throughout this period.

In addition to those mentioned, other important decreases in deaths from 1928 to 1929 were from influenza, diabetes mellitus, pneumonia, all forms, and nephritis.

Deaths from suicide increased from 404 in 1928 to 453 in 1929.

The deaths from accidental and unspecified external causes increased continuously from 1,790 in 1926 to 2,268 in 1929, and the increase of 118 from 1928 to 1929 was nearly accounted for by the increase in deaths from accidental falls (420 to 518). While the deaths from automobile accidents, excluding collisions with railroad trains and street cars, decreased by 8 from 1928 to 1929, the number of deaths from this cause increased from 384 in 1926 to 612 in 1929, or approximately 60 per cent in the 4-year period.

Delaware—There were 3,132 deaths in Delaware during 1929 as compared with 3,196 in 1928.

The decreases in deaths from diseases of the heart, nephritis, typhoid and paratyphoid fever, and syphilis in 1929 as compared with 1928 were almost balanced by increases from pneumonia, all forms, influenza, whooping cough, and diabetes mellitus.

There was a steady decline in the number of deaths from syphilis, tuberculosis, all forms, and nephritis from 1926 to 1929.

There was a considerable decrease in the number of deaths from accidental and unspecified external causes in 1929 as compared with 1928, the decrease being more than accounted for by decreases in accidental drowning, accidental falls, and automobile accidents, the last of these causes dropping from 75 to 57.—*Mortality Statistics: Provisional Summaries,* U. S. Census Bureau.

Public Health Conditions and Administration in Burma—Burma is divided into 7 civil divisions for purposes of administration. The civil surgeon of each district is also the medical officer of health and is required to advise all local authorities in his district on matters of public hygiene. The local authorities employ public health workers. In 1927, they engaged 84 public health inspectors, 27 of them in rural areas. Birth and death registers are in charge of village headmen and are inspected by district health officers. Registration is

inaccurate and incomplete because of illiteracy and the fact that registrars have to bear the expense of submitting returns. The provincial birth rate was recorded as 25.08 per 1,000 in 1927; the rural birth rate was 24.70 and the urban 27.98. The provincial death rate was 19.55 per 1,000, the proportion of males per 100 females being 114; the rural rate was 17.38, the urban 36.21. Infant mortality was recorded as 198 per 1,000, 118 male infants dying to every 100 females, 51 per cent of these deaths being between the ages of 2 and 6 months.

There were 4,528 deaths from cholera, 1,704 from smallpox and 3,508 from plague. Urban areas were affected more by these diseases than rural, especially in the case of plague. Cholera is combated by inoculations and vigorous campaigns are carried out whenever cholera breaks out in epidemic form. Vaccination for smallpox is carried out by public vaccinators employed by local authorities. From cases treated in hospitals, statistics show case mortality to be 7 per cent among vaccinated and as high as 32 per cent among unvaccinated persons. Plague is combated by rat destruction and inoculation. There were 102,859 persons inoculated in 1927, of which 60,235 were done in towns. Venereal disease is known to be very prevalent but there are no reliable statistics available. Syphilis was found to be present in 10 per cent of 897 postmortems in one of the large hospitals.

Local authorities are responsible for expenditures of water supply, drainage, road cleaning and watering, sewage disposal, public markets and abattoirs. They receive an annual government contribution to maintain these public health works. Municipal committees seldom receive any grant. Government inspection of schools and school children is compulsory in government high and middle schools.—Major H. C. C. Cherry, *J. Roy. San. Inst.*, 51: 20–28 (July), 1930.

Mortality Experience of the First Six Months of 1930—A new record for low mortality has been registered for the winter and spring seasons of 1930. This applies to Canada as well as to the United States. In the latter, the white population has enjoyed better health than during the corresponding period of any previous year; and the death rate of the colored people has never been so low—with a single exception. The improvement has probably extended to all ages of the population—although this cannot be stated unreservedly at this writing. It is certain, nevertheless, that the chief scourges of childhood are taking a smaller death toll than ever before; that tuberculosis, which causes death chiefly in early adult and middle life, is recording a death rate far below the previous minimum; and that the mortality rates from several diseases, which are important factors in later life, have shown noteworthy declines in 1930.

These statements are based on the mortality experience of approximately 19,000,000 persons—the industrial policy holders of the Metropolitan Life Insurance Company in the United States and Canada. The health records of this large cross-section of the population have invariably proved, in the past, to be accurate indices of the health conditions prevailing in the general populations of both countries.

As in 1929, a large reduction in the tuberculosis death rate to a new minimum bids fair to be the outstanding public health fact of the year. The figure for the first half of 1930 was 85.6 deaths per 100,000 policy holders. Both white and colored policy holders have shared in the decline, with the former showing the greater drop in death rate.

The improvement in the diphtheria mortality rate is an outstanding item in

the health record of 1930, to date, and is second in importance to the splendid record for tuberculosis. The diphtheria death rate has dropped approximately 27 per cent in a single year. Unless unexpected epidemic prevalence of this disease is encountered at some time during the latter half of the year, 1930 will not only register a new minimum death rate for diphtheria, but will mark the largest year-to-year drop ever recorded. Still another favorable item in the 1930 health report is the record for diseases related to childbearing, which have every prospect of recording a new minimum death rate this year.

The absence of any widespread prevalence of influenza has resulted in about the normal winter and spring death rate for that disease. The drop in influenza mortality has been reflected in a considerable decline for pneumonia. The decreases recorded this year for heart disease and chronic nephritis are also due, in part, to the lower prevalence of influenza which, when epidemic, always hastens the deaths of many persons who suffer from chronic diseases. A slight decline in the cancer death rate has persisted throughout the half-year. The diabetes death rate (19.6 per 100,000) may be compared with 21.0 for the like period of 1929.

Suicides have been a little more frequent than in the corresponding part of 1929, while the homicide death rate and that for fatal accidents have dropped slightly. The mortality from automobile accidents is higher than ever before at this time of the year. Thirty-eight hundred and ninety-nine Metropolitan Industrial policy holders were killed in 1929 in motor vehicle accidents; and the estimated loss of life in the United States from this cause was 31,400. These totals will probably be exceeded this year.—*Stat. Bull.*, Met. Life Ins. Co., 11: 3–6 (July), 1930.

PUBLIC HEALTH ENGINEERING

ARTHUR P. MILLER, C. E.

PROGRESS REPORT OF PULASKI, VA., RESERVOIR STUDIES*

F. J. SETTE

Associate Professor of Sanitary Engineering, Virginia Polytechnic Institute, Blacksburg, Va.

THERE is usually objection on the part of laymen to stored water supplies. There are various reasons for this objection. In the first place, stored water is classed in their minds as stagnant. Again, odors and tastes are at times objectionable in impounded water, enhancing the popular dislike. Other troubles, too, add to the general distrust.

Many supplies in Virginia depend mainly on springs of unknown origin and uncertain flow. When it becomes essential to provide a more certain supply, it will be necessary to impound surface waters. Therefore, at the suggestion of Richard Messer, Chief Engineer of the Virginia State Department of Health, a study of an existing reservoir —that at Pulaski—was begun. This investigation is to answer, if possible, questions as to odors and taste, corrosion, tuberculation, and the like. The study was to include not only the physical, chemical and biological conditions, but also run-off. Unfortunately, since the supply is not entirely metered, this phase of study has not yet been started. The microscopic life has not as yet been so prominent; few organisms having developed in quantities large enough to be interesting. The report, therefore, resolves itself into a study of the physical and chemical conditions.

The present supply is obtained from a watershed lying in the foothills of Draper Mountain approximately 3 miles southwest of Pulaski. This shed has an area of 1,746 acres, or 2.73 square miles, is entirely owned by the city, and is adequately protected. The reservoir impounds about 1/5 billion gal. of water. At the point of sampling, the depth is about 50 ft. when the surface of the water is level with the spillway. The sampling point is directly opposite the intake. The reservoir is Y shaped with the intake at the end of the Y stem. At this point, it is about 215 ft. wide and 50 ft. deep when full.

The study began on March 17 of this year. Apparently the spring overturn had occurred several weeks before, and was nearly at an end. It will be noticed that for 3 weeks the water was in a state of unstable equilibrium, finally having its last overturn on March 31. After

TABLE I

Temp. ° F.

Depth	March 17	March 24	March 31	April 7
Top	47.5	43.4	44.5	47.5
10′	47.2	45.2	44.5	47.5
20′	47.1	44.6	44.5	47.5
30′	43.6	44.5	44.3	45.7
40′	43.6	44.1	44.3	45.5
Bottom	43.8	44.1	44.1	45.5

*Presented at the Second Annual Conference of the Virginia Water and Sewage Works Association at Norfolk, Va., June 19–20, 1930.

this date, the summer stagnation began in earnest. As the weeks progressed the stratification became more pronounced.

FIGURE I

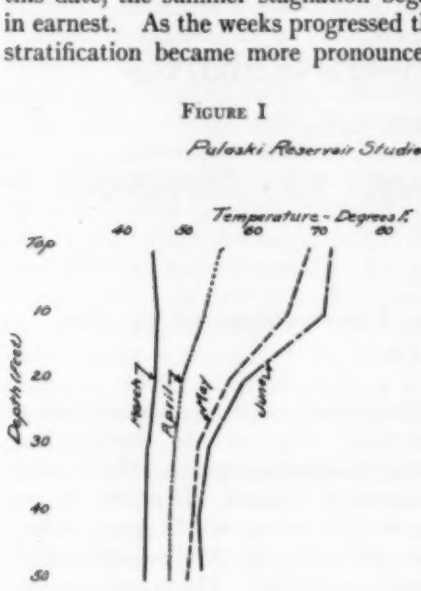
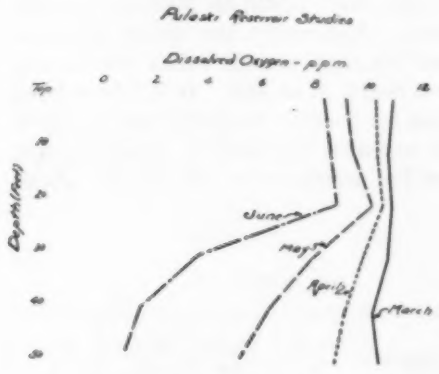


Table I gives the temperatures for the weeks around circulation. It can be seen that the reservoir was directly stratified on March 17, but this condition was only temporary. A cold snap, that week, overturned the water, which accounts for warmer bottom tempera-

FIGURE II



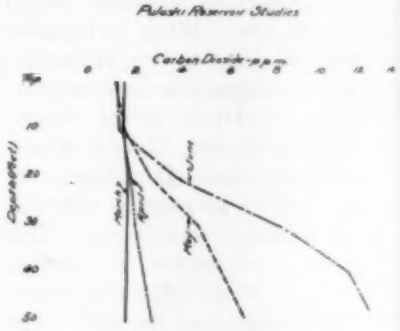
tures on March 24. On March 31, the entire body of water was in circulation, although there is a difference of 0.4° F. between the top and bottom. It can be said, then, that for the period under discussion the reservoir was in circulation. It is probable that the lake was in circulation for a month before observation began.

The averages for March, April, May, and June are plotted (see Figure I) to show the trend in stratification. It will be noticed that the zone of circulation is very clearly limited to the upper 10 ft. of the lake. This is even more apparent in Figure IV. On the other hand the zone of stagnation seems to begin at the 30-ft. depth. On June 30 the dissolved oxygen content was 1.06 p.p.m. at this level, whereas the average for the month was about 3.80. This shows that the oxygen is being used up very rapidly at this point.

Figures II and III show the trend of the dissolved oxygen and carbon dioxide content of the various layers for the different months.

What effect has stratification on the

FIGURE III

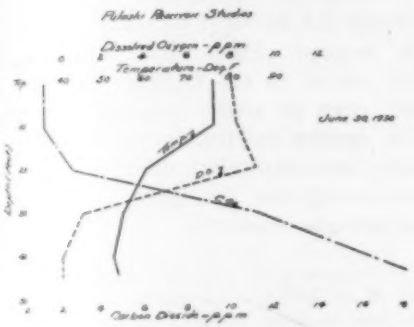


quality of the water? The question can be answered by the results obtained. It will be seen on Figures II and III that during the period of overturn, the water was fairly well aerated and decarbonated, but as stratification begins, a similar condition starts in the dissolved gases. The dissolved oxygen in the zone of circulation shows how well aerated that zone is. But, as the depth increases, the oxygen becomes depleted; being used up in the oxidation of the organic matter which settles to the bot-

tom. On the other hand, the carbon dioxide increases with the depth, a natural consequence of decomposition.

Curves showing the relationship between temperature, dissolved oxygen and carbon dioxide at various depths for June 30 are plotted on Figure IV. It will be noticed that at 20 ft. there is plenty of oxygen and little carbon dioxide.

FIGURE IV



Various organisms have been found, but the most prolific thus far are pandorina, dinobrion and glenodinium. These organisms will give trouble when they become more numerous. Some other organisms have been found which are interesting, but thus far they have not been identified. Since these organisms are among the higher forms of life, their identification has been allowed to wait.

Water at the Pulaski reservoir is drawn from about the 20-ft. level. Thus far this level has been well within the zone of circulation and transition. However, as the season advances, it may be that it will fall in the stagnant zone. Then trouble may be expected not only from organisms, but also from stagnant water. Later on, tap samples will be taken to determine which of these two is responsible for whatever troubles may develop.

It will also be noticed that the CO_2 content of the water at the 20-ft. level is now 2.6 p.p.m. and is increasing rapidly. Since the water is very soft, most of the CO_2 is aggressive and the water may become highly corrosive, causing red water. This condition will occur undoubtedly in the late summer. However, the remedy can be determined only after a complete study, the results of which I hope to present next year.

INDUSTRIAL HYGIENE

EMERY R. HAYHURST, M. D., PH. D., AND LEONARD GREENBURG, M. D., PH. D.

The Mortality of Shopkeepers and Their Assistants—Tables accompanying this article show that youths predominate as shop assistants, e.g., a comparative statement of age group proportions showing that per 1,000 total females there are employed in this group at the age of 16 years, 3,048; at 20 years, 2,285; at 25 years, 1,063; at 35 years, 542; at 45 years, 339; at 55 years, 187; at 65 years, 102; and at 70 years, 41. For the same ages the total employed per 1,000 occupied and retired persons are, respectively: 1,392; 1,234; 1,061; 788; 532; 310; 200; 142. Males are relatively more numerous than total occupied males at all ages under 35 and progressively less so afterwards. This is true also for females, in whose case the reduction in old age is even more extreme.

Evidence as to the health of shop assistants is confined to that of males during 1921–1923. Those employed in (1) businesses for the sale of fish, meat, greengrocery and milk; (2) businesses for the sale of grocery and provisions, and (3) businesses for the sale of textiles and clothing, are considered (tables accompany). It is noted that the mortality of those in fish, meat, etc., shops and in drapery shops, which form almost 40 per cent of the whole number of shop assistants, is considerably above that of their employers. In fact, mortality seems to be high for youths employed as shopkeepers and it seems that the highest mortalities are among those employed in open air conditions (fish, meat, greengrocery and milk trades).

The diabetes mortality is excessive for both employers and employees and especially for those engaged in the food distribution trades. Drapers, who are not especially subjected to overeating, form the only category not returning excessive mortality from diabetes.

Phthisis for shop keepers is below the average but for shop assistants is above the average. Here again it is found that, so far as the fresh air associated with open air trades proving a protection against respiratory diseases, mortality from respiratory diseases was over the average for this group, and under the average elsewhere.

If cirrhosis of the liver be accepted as an index of alcoholism, as it appears to be much the best provided by the returns, shopkeepers as a class and their assistants alike are notably alcoholic. In every case this rate exceeds the general average, to an extent ranging from 22 per cent for drapers' assistants, to 142 per cent for butchers, fishmongers, etc.

Comparative mortality figures showed cancer to be excessive among fish and meat dealers; cerebral hemorrhage was likewise excessive in this group as well as diseases of the circulatory system, heart disease and Bright's disease.

Shopkeepers ran below shop assistants in tuberculosis, respiratory tuberculosis, and bronchitis, but equal to or above in all other afflictions, including suicide and accidents.—T. H. C. Stevenson (General Register's Office, Great Britain), *Med. Off.*, 1147: 26–28 (July 19), 1930.

The Silicosis Bill—

The government bill entitled the Workmen's Compensation (Silicosis) Bill has been read a second time in the House of Commons. It empowers the home secretary to make schemes to enable employers to pay compensation to work people who contract silicosis and provides for improved medical arrangements for the diagnosis and certification of the disease.

It has been found that the diagnosis requires great skill and the latest scientific appliances. The bill is intended to secure uniform and effective medical arrangements, by means of medical boards and panels in different centers, the work of which would be coördinated. It is also intended to provide for the payment of compensation for partial incapacity as a consequence of the disease in all the industries concerned. It is not suggested that all workers, who number between 60,000 and 70,000, need to be medically examined, but periodic examinations will be necessary for the early discovery and arrest of the disease before it has made progress. The bill extends compensation to workers in asbestos dust, who number about 2,200, of whom 1 in 8 have been found affected with silicosis.—

London Letter, *J. A. M. A.*, 94, 4: 277 (July 26), 1930.

Night Work and Women's Health in Japan—The Factories Division of the Urban-Prefectural Office of Osaka has made public the results of an investigation of Dr. H. Sukekawa into the effect of the abolition of night work upon the health of women workers. The study covered 1,000 women workers, from 14 to 30 years of age, living in dormitories attached to cotton-spinning factories, and covered the 5 years ending in 1930, during which night work was abolished.

Little variation was noted in the sickness rate, chiefly because workers obtained medical advice more frequently after the establishment of the health insurance system than before. Cases of tuberculosis, however, were not so numerous, and the average duration of sickness decreased. The attendance rate was 92 per cent before abolition of night work and 96 per cent after abolition. An improvement of the workers' appetites was proved by the increase of the per capita consumption of rice (10 per cent). Fatigue symptoms were found to be less in evidence.

When night work was practised, the maximum loss of weight during a week of night shifts was 3.9 kg. After the abolition of night work, the maximum loss of weight during a week of afternoon shifts (2 p.m. to 11 p.m.) was 1.3 kg. At the same time, the number of persons who gained in weight, as well as the actual amount gained, during a week of morning shifts (5 a.m. to 2 p.m.) increased considerably.—*Indust. & Labour Inf.*, 34, 8: 280–281 (May 26), 1930, taken from *Osaka Mainichi*, 27 March, 1930.

The Best Light for Clerical Work—The National Physical Laboratory has investigated the subject of light for clerical work and made trials in some clerical offices badly supplied with natural daylight. Lights providing artificial daylight were compared with tungsten lamps.

The results obtained under laboratory conditions showed that, for equal illumination, artificial daylight was definitely preferred by clerks to light of the color of that given by a tungsten filament vacuum lamp. Light distributed over a room from an artificial window was preferred to light from a semi-indirect bowl fitting suspended from the ceiling. The average hourly rate of output of clerks showed a decided preference for light of artificial daylight color as compared with that of a tungsten vacuum lamp. Full scale experiments were then made in government offices by installing artificial daylight. Definite advantages were found when the artificial light had to be mixed with natural light, as in basement rooms. But in ordinary offices with effective window lighting, where artificial light had to be used only when natural light failed, opinions varied as to the relative merits of artificial daylight color and that of ordinary vacuum or gas-filled lamps.—

London Letter, *J. A. M. A.*, 95, 4: 276–277 (July 26), 1930.

Progress Announcement: VI International Congress of Accidents and Industrial Medicine—A meeting of the organization committee was held early in August, 1930, at which 13 were present from various countries. The honorary presidents and an honorary committee were selected, the former

comprising M. Albert Thomas of the B. I. T., Prof. Dr. Kaufmann of Zurich, Prof. Dr. Devoto of Milan, Sir Thomas Oliver, and M. Pometta.

The date of the Congress was set to begin August 3, 1931, at Geneva and to last 5 or 6 days. Membership is to be $5.00 (in American money). The various nations are, or had been, invited to send official delegates. The exact title of the Congress was fixed for four different languages, the title hereof being that selected for the English language.

The committee for the United States so far accepted is comprised of Dr. Francis D. Donoghue of Boston, Mass., Dr. Emery R. Hayhurst of Columbus, O., and Dr. Francis D. Patterson of Philadelphia, Pa. The personnel from 15 other countries was likewise announced.—Communication from the General Secretary, Geneva, Aug., 1930.

Protection against Lead Poisoning in Germany—The German Government issued an Order on May 27, 1930, relating to the protection of workers engaged in house-painting against the risks of lead poisoning.

The order prohibits the use of white lead, sulphate of lead and products containing these pigments in the internal painting of buildings whenever the quantity of lead contained exceeds 2 per cent. It requires protective measures against the inhalation of lead dust during the work of scraping paint. It prohibits the employment of women and young persons under 18, other than apprentices and journeymen painters, and requires the provision of lavatories and cloakrooms, and the posting of a copy of its provisions and of a warning against lead poisoning therein. It also gives to inspectors the right to require a medical inspection whenever they deem it necessary, and compels the employer to provide for the medical supervision of the staff if it exceeds 5 persons.

The doctor has the right to require any worker showing symptoms of poisoning to cease work until he is completely cured. Medical inspection on engagement is compulsory, and the workers must be informed of the risks they incur. On the advice of the doctor, any worker for whom the nature of the work constitutes a danger must be excluded from tasks involving risks of poisoning. In undertakings of a certain size the employer must keep a health register, open to examination by the inspectors.—*Indust. & Labour Inf.*, 35, 1: 54 (July 7), 1930.

Health Regulations in Bolivia—A Presidential Decree of June 3, 1929, lays down measures for the protection of the workers' health in industrial establishments in Bolivia.

The General Directorate of Health is entrusted with the control and supervision of health and safety in all the industrial establishments of the Republic without exception; it will draw up regulations regarding industrial hygiene, protective devices for machinery, lighting, ventilation and other measures for the protection of the workers against dust, vapors and industrial accidents.

A register will be kept in each industrial establishment, in which the health authority will enter observations relating to the protection of the workers' health; these observations must be complied with within a fixed time limit.

Representatives or proprietors of industrial undertakings are required to send to the General Directorate of Health a complete monthly list of sick workers, specifying the nature of their sickness, and also the names of those workers who are habitually in a state of intoxication. These lists will be considered confidential, and the General Directorate of Health may not make any use of them other than of an educative nature. In the event of industrial undertakings paying no heed to the instructions of the General Directorate

of Health, the latter will have the necessary improvements carried out at the expense of the proprietors.—*Indust. & Labour Inf.*, 34, 8: 282 (May 26), 1930, taken from *Boletin de la Direccion General de Sanidad Publico*, La Paz, Aug., 1929.

Carcinogenicity of Oils—The Manchester Committee on Cancer reports that two of the largest oil producing companies in the world have recognized the importance of discovering a safe lubricating oil at reasonable cost and are assisting the committee's staff in its investigations.

From experiments made it would appear that carcinogenic compounds begin to be formed between 500° and 600°, the maximum yield lying between 800° and 900° C. A synthetic tar containing the carcinogenic principle has been made, such that a 5 per cent solution was found to be more effective in producing cancerous growths than shale (petroleum) oil, the most dangerous commercial oil, but it has now been found possible to produce tars at least 100 times as powerful as shale oil. It was found that applying petroleum oil five times instead of two per week increased the carcinogenic potency fifty-fold.

The staff found that olive oil, neatsfoot oil and sperm oil were non-cancer producing and they have reason to suppose that natural skin fat is an important factor in the prevention of experimental cancer. Thus lanoline applications alternated with synthetic tar applications delay the development of tumors. Where lanoline is applied twice as often, cancer does not appear, the protection afforded by alternate applications being much less marked.

The committee is now investigating the amount of sulphuric acid "washing" necessary to detoxicate petroleum oils and render them harmless as carcinogenic factors.—Unsigned, *Brit. M. J.*, 3615: 750 (Apr. 19), 1930.

Lead Tetraethyl in Motor Spirit—Among interesting features of the final report of the Departmental Committee appointed by the British Minister of Health, who inquired into the possible danger to health arising from the use of lead tetraethyl in motor spirit, are the following:

Though new and more refined methods for detection of lead in the urine were devised, no reason for disagreement with the results of the American inquiry was found, namely, that comparatively larger quantities were excreted by town dwellers and more still by workers exposed to special risks, excretion of lead being caused partly, if not mainly, by inhaling dust containing lead, involving a fairly close relation between the degree of exposure to lead and the proportion of lead in the urine. The average amounts found were 0.04 mg. per liter.

The lead content of settled dust in streets and garages was investigated by sampling in London and neighboring country districts, and the proportion yielded varied within the wide limits of nil to 3.3 per cent. The committee hold that the risk of chronic lead poisoning from daily inhalation of fumes over a long period is remote, the lead content of the dust in garages having been found greatly inferior to that in factories using lead.

It was likewise deemed improbable that pedestrians would inhale a dangerous quantity of lead escaping from exhaust pipes of cars during acceleration, while the risk from absorption of lead tetraethyl owing to contact of ethyl petrol with the skin is considered so slight as to be negligible.

No legislative action is advised by the committee, but special precautions are outlined to be followed by proprietors and vendors.—*Indust. & Labour Inf.*, 36, 8: 278–279 (May 26), 1930, taken from *Brit. M. J.*, 3614: 712 (Apr. 12), 1930.

FOOD, DRUGS AND NUTRITION

WALTER S. FRISBIE

The Fat-Soluble Vitamin of Milk—Reference is made to the report a number of years ago of the observations that apparently fat-free milk promoted growth in animals; furthermore, that other investigators had reported a deficiency of vitamin A factor in washed butterfat, all indicating the possibility of a vitamin A factor in the milk other than in the fat.

Short-horn cows furnished the milk which contained 3 per cent fat, and 12.05 per cent total solids. The milk was concentrated at a low temperature to water content of 22.15 per cent. The separated milk containing 0.1 per cent fat was concentrated to a water content of 32.75 per cent. The separated cream was churned and the buttermilk concentrated. To determine vitamin A butter was fed in daily doses of 0.1 gm., 0.2 gm., and 0.6 gm., and in the whole milk and in the skim milk plus buttermilk vitamin A was determined by administering doses of the former approximating one-half those of the butter and in the latter mixture in amounts somewhat greater than the amount of butter given. In addition, the basal diet was fed *ad lib*.

To test vitamin D a special diet was devised and observations were made by the increase in weight produced by the addition of vitamin D in this diet, free from this vitamin but otherwise adequate. Growth curves of the animals on the skim milk plus buttermilk were more or less proportional to the residual fat present, a marked difference being noted between the minimum, 0.016 gm. residual fat, and the maximum, 0.066 gm. In the latter case the growth approximated that with 0.1 gm. of butter, indicating the minimum dose of milk fat somewhere between these quantities. The same ratio of growth to butterfat content was noted in those rats fed the whole milk.

While results with vitamin D were not so satisfactory owing to the limitations of the method, the conclusion is drawn that this vitamin is associated with the milk fat since the growth promotion on the skim milk was proportional to the amount of residual fat.

The analysis of the femurs of these rats indicated the ash-organic bone residue ratio to be proportional to the amount of milk fat, the optimum being obtained on a daily dose equivalent to 0.2 to 0.6 gm. butter.

It is concluded that both vitamin A and D in milk are associated with milk fat and no more concentrated in one fraction of the fat than in another. There is no appreciable loss in either vitamin due to separating or churning. —Margaret Emily Frances Crawford, John Golding, Edith Olga Veronica Perry and Sylvester Solomon Zilva, *Biochem. J.*, 24, 3: 682, 1930.

Brucella Abortus in Certified Milk—*Brucella abortus* has been demonstrated in samples of raw milk by inoculation into guinea pigs by many investigators. Evans, however, in 1915, successfully demonstrated the organism by plating methods. Hasley has shown that *B. abortus* can be isolated from certified milk on plates by using varying amounts of milk spread on poured liver agar (Stafseth) plus gentian violet in a dilution of 1:200,000 placed in an atmosphere of 5 per cent CO_2 and incubated for 3 days at 37° C. *B. abor-*

tus was grown from 10 of the 230 samples examined. The highest number of organisms found was 8 per c.c. of milk and the average was 2 per c.c.—D. E. Hasley, *J. Infect. Dis.*, 46: 430 (May), 1930.

The Calcification of the Lung in Healthy and Tuberculous Rabbits with Large Doses of Irradiated Ergosterol—Following researches on the calcification produced by irradiated ergosterol, these authors have determined the calcium content of the lung in 4 groups of rabbits: (1) normal rabbits, (2) normal rabbits treated with irradiated ergosterol, (3) tuberculous rabbits, and (4) tuberculous rabbits treated with irradiated ergosterol.

The ergosterol in oil was administered by various means but the most advantageous was found to be through the mouth. Furthermore, doses were sought which would prove calcifying but not too toxic whether using slightly irradiated ergosterol (45 minutes) by mouth, or strongly irradiated (6 hours) by other channels.

At death the lungs of the animals were ashed and calcium determined, figures being reported on pulmonary tissues dried at 100°. Comparisons of calcium of the thoracic and abdominal aortas were included. In normal rabbits the lung calcium varied between 0.10 and 0.15 gm. per 100. In the rabbits receiving ergosterol this figure varied from 0.42 to 2.06 gm. per 100.

The rabbits were inoculated with a known type of bovine bacillus of tuberculosis. In their defense against the tuberculosis and accompanying pneumonia there was an apparent attempt to calcify the bacillary lesions, but the infection was so great as to finally carry off the animals. In the lungs of 3 which lived 50, 82, and 87 days, the calcium was found to be 0.16, 0.68, and 0.67 per 100. In the case of the tuberculous rabbits with ergosterol, calcification ranged from 0.19 to 0.68 per 100 of lung calcium.

According to the figures, irradiated ergosterol in normal animals can increase the rate of calcification of the lung from 1 to 20. The tuberculous rabbit can by natural means increase by 5-fold the original calcification but with appropriate doses of ergosterol sufficiently irradiated but nontoxic it is possible to increase this figure of lung calcium from 1 to 80.

Even though these animals succumbed to the experimental tuberculosis, attention has been drawn to the importance of calcium as aiding in a certain measure the defense of the organism. It remains to be seen if in mild or chronic cases this calcification can retard or check the development of tuberculosis.—H. Simonnet and G. Tanret, *Compt. rend. Soc. de biol.*, 190: 1526 (June 23), 1930.

Comparative Studies of the Influence of Acid-Forming and Base-Forming Diets on the Metabolism of Rats—Most of the diets recommended by pediatricians for infant feeding are calculated to be acid-forming, while the daily requirements for growth indicate a preponderance of basic elements in inorganic constituents. For this reason experiments were undertaken on the feeding of rats to determine the effect of these elements on infant metabolism.

Young rats between 30 and 35 gm. were used and were maintained on natural foods on which the acid-forming and basic elements were determined. Analyses of the blood of the two groups were made at the end of the 28th week and in addition to the pH value the inorganic radicals determined were CO_2, Cl, P, and Ca. The organic determinations included sugar, cholesterol and protein.

The result of the acid-forming diet was reduction in serum phosphorus, to-

tal alkali reserve and the pH value with a rise of chloride, sugar and cholesterol. Converse changes followed the base-forming diet.

Histological examination of bones indicated a development of rickets in the acid diet. On the base-forming diet there were no thoracic deformities, the extremities were large and firm although the cell structure showed some resemblance to rickets. Analysis of the bone indicated a preponderance of ash on the base-forming diet. Animals on the high base diet showed greater average gain in weight than those on the acid diet. Weight curves show definitely these marked changes.

The protein in each group remained constant when the pH of the "basic" animals was on the alkaline side and of the "acidic" animals on the acid side of 7.4. The fat content in its degree of unsaturation as evidenced by the iodine number apparently was uninfluenced by the proportion of acid and base element. The fact that base-forming foods increased the weight while an opposite result obtained with an acid diet is discussed on the theory of the electronegative charge of the protoplasm at pH 7.4, requiring for its maintenance in solution electropositive ions. While definite conclusions could not be made in the case of infant feeding as a result of this experiment evidence seems sufficient to warrant a consideration of these principles in practical infant feeding.

It is probable that a mineral deficient diet such as is found in refined cereals may be compensated by adding fruit and vegetable juices and as a defense against rickets the basic diet favors the retention of calcium and phosphorus. Basic-forming food is also an advantage in correcting the acidosis due to acute infections and gastrointestinal disturbances.—Emma Louise Samuel and I. Newton Kugelmass, *Am. J. Dis. Child.*, 39: 687 (Apr.), 1930.

On a Possible Preparation of a Highly Active Ergosterol (Vitamin D) from Raw Coffee—A substance can be obtained from raw coffee and in very small amount from roasted coffee as a constituent of the unsaponifiable matter of the fat, which gives the spectrum of active ergosterol. The substance loses its activity in several weeks. On rats made rachitic by McCollum's diet, 3,143 therapeutic and prophylactic studies showed the ergosterol to have curative and protective properties. The article includes technical comment on the handling of experimental animals for Röntgen photography.—L. Schwarz and F. Sieke, *Arch. Hyg.*, 104: 65 (Aug.), 1930.

PUBLIC HEALTH NURSING

EVA F. MACDOUGALL, R. N.*

Who Is a **Public Health Nurse?**—The *Board Members' Manual* gives the following definition of a public health nurse:

The term public health nurse applies to any graduate nurse who is taking part in an organized community service to individuals and families, including the interpretation and application of medical, sanitary and social procedures for the correction of defects, prevention of disease and the promotion of health, and may include skilled care of the sick in their homes. Formerly, the term "visiting nurse" referred to the nurse whose chief activity was bedside care, and "public health nurse" to the nurse whose principal efforts were educational. The term public health nurse, however, has come to include both groups of nurses, and is so used in this manual.

In the *New York State Health News* for July 7, 1930, a few outstanding points about the public health nursing movement, prepared by Ada Newman of the Wisconsin State Board of Health for the U. S. Public Health Service, help to explain several phases of public health nursing:

Public health nurses are found in large numbers in the original task of caring for the sick in their own homes. These nurses are graduates of 3-year hospital training courses and were either taught visiting nursing by the staff school or took a postgraduate course.

The next largest service of the public health nurse is that of school nurse. She assists the health officer in communicable disease control, aids the school physician in examination of school children, and makes home visits to interpret the findings and advice of the physician to the parents.

Public health nursing is recognized not only from a humanitarian point of view and as an educational force, but also on the basis of commercial value. This is demonstrated by the fact that business concerns employ nurses in large numbers, believing that in order to have their plants operate on a more efficient basis, the health of the employees and of their families should be protected. Insurance companies also employ many nurses to work among their policy holders. When we consider that the only motive back of industrial nursing is a financial saving for the employing body, it speaks very highly for the economic value of such service.

The latest nursing activity to be developed in the United States is rural community nursing. These rural programs are planned to cover in part health educational work for the adult and for the school chi'd, infant welfare, and the prevention of communicable diseases; in short, all phases of nursing service.

Mary S. Gardner's book *Public Health Nursing*, which is recognized as the standard textbook on public health nursing the world over, has listed in the table of contents under "Special Branches of Public Health Nursing" the following: Tuberculosis, Child Care, School, Mental Hygiene, Industrial, and Venereal Disease.

The National Organization for Public Health Nursing, with headquarters in New York, is recognized as the standard making body in the public health nursing field. It is a member of the National Health Council and advises and assists the American Public Health Association through its Committee on Administrative Practice in matters of policy and administration, and in field studies where public health nursing is concerned. This organization has industrial, school, tuberculosis and social hygiene specialists on its staff, and has been mainly responsible for the great number of visiting nurse associations

* Please send printed matter or other material relating to public health nursing to Eva F. MacDougall, 126 State House Annex, Indianapolis, Ind.

which have sprung up in this country since its establishment in 1912.

It might almost be said that any graduate registered nurse who is doing nursing other than institutional or private duty nursing, or who is a physician's office assistant, is a public health nurse, and Annie Goodrich says that every graduate nurse should be a public health nurse in that she teaches health to the public.

Supervision—A very good definition of supervision is that made by Fannie Dunn of Teachers College: "Instructional supervision has the large purpose of improving the quality of instruction, primarily by promoting the professional growth of all teachers, and secondarily and temporarily by correcting deficiencies of preliminary preparation for teaching by training teachers in service."

Supervision does four things:

1. *Inspection*—The old idea of supervision was inspection alone. It was catching the worker and watching his deficiencies.

Today inspection is still necessary in supervision to gather the facts, "to know the situation, particularly the weaknesses, deficiencies and possible betterments."

2. *Training*—If this is to do any good there needs to be a definite program for it over a definite period of time. Inspection reveals what the nurses need, and training is definitely directed to the supplying of these needs.

A training program should be two-fold. The aim is to improve the worker in the direct performance of his everyday work, and also in a more general way by means of suggesting supplementary reading and by organizing conferences.

3. *Guidance*—By this is meant that the better teachers are stimulated to experiment, and to help plan the program of supervision by giving the supervisor practical suggestions. They are also inspired to "look for promotion, and further training and advancement." This implies "developing and maintaining morale, professional spirit, *esprit de corps*." Since it takes great leaders to bring out more than average work among the workers this development of morale is one of the finest contributions the supervisor can make to her staff.

One of the methods of developing this morale is to "maintain a personal attitude which is fair, sympathetic, kindly and tolerant." Another method is to help willingly and happily when help is needed. The last way is for the supervisory staff to know their stuff so they *can* help.

4. *Research*—A good supervisor should be open minded enough to be willing to try out new things in order to find better ways of doing the work in hand.

There are four other points which show the contrast between the new and the old supervision:

1. The new supervision is continuous, not piecemeal, and is not confined to visiting and conferring with the worker himself.

2. "Traditional supervision was inspection. Today it is help and assistance and encouragement."

3. The old supervision was done by one person. Today good supervision implies several different supervisory contacts just as several judges are better than one.

4. "Supervision today is not authoritarian. It develops out of the need of the workers under supervision." There are several reasons why the new supervision has come into use:

a. "It is an accepted business principle in many business corporations."

b. "The average worker in any field is not a highly trained individual," and needs supervision to move towards the ideal.

c. Even a highly trained worker cannot keep up with the new developments in the field. "She has to have an agency, a supervisory staff which reads, digests, and corrects the new material to the level of the classroom worker."—

W. H. Burton, Ph.D., Supervision, *Am. J. Nurs.*, XXX, 8: 1045–1051 (Aug.), 1930.

Every public health nurse will know on reading this article that although Dr. Burton speaks from the point of view of a teacher, every point he makes applies perfectly to supervision in public health nursing, because every public health nurse is a teacher. There has been a great deal said and written the last few years about staff education in every public health nursing organization. And surely any one getting these points in Dr. Burton's paper will see the need of staff education and the opportunities that it presents, both to the supervising nurses and to the staff.

For School Nurses—Scales have a very definite part to play in the school health program as an educational means of interesting children in health and health practices. Emphasis is now placed upon gain in weight instead of on underweight status. A child failing to gain for several months is abnormal and should receive medical attention.

Several studies have brought about this shift of emphasis. The Massachusetts State Department of Public Health found after examining 50,000 school children in that state that one-third of the children who were pulmonary cases were not underweight, and one-fifth of the latent tuberculosis cases found in the contact group were in normal or overweight children. They concluded that children exposed to an open case of tuberculosis are infected with the tubercle bacillus to the same degree regardless of nutrition or nationality.

Dr. Raymond Franzen of the American Child Health Association after a school health study concluded that height is insufficient skeletal information to use as a basis of weight classification.

The Massachusetts State Department of Health in their 10-year program for discovering children with some evidence of tuberculous disease now give all children a tuberculin test, and those who react positively are X-rayed. If the X-ray film shows evidence of tuberculosis or other pulmonary conditions the child receives a thorough physical examination by the state physician. In this way it is estimated that 50 per cent or more of tuberculosis cases in adult life can be picked out of the 10 per cent of children who are shown by the X-ray to have been infected.—Louise Strachan, What Do Scales Weigh? *School Life*, XV, 9: 178 (May), 1930.

EDUCATION AND PUBLICITY

EVART G. ROUTZAHN*

An Attractive Annual Report—The 1929 report of Palama Settlement of Honolulu is unique. The pages are in groups of three different sizes and bound terrace fashion, each "terrace" dealing with one phase of the work, namely, Community Service, Nursing and Medical, Recreation. Several of the statistical tables are presented in the form of ingenious picture graphs. Line drawings brighten most of the pages. The chapter "One Day with a Palama Health Nurse" sketches a typical day's experience from 8:00 A.M. to 4:00 P.M., which is an excellent way of visualizing for the layman a more or less intangible service. Philip S. Platt is director of Palama Settlement.

Quackery and the Spotlight—Modern health education, with its emphasis on the positive aspects, is supposed automatically to neutralize ignorant deductions and false teachings. Yet it is the interest created by legitimate health education that feeds the quacks. A direct attack on chicanery is a part of health education.

Health Commissioner Shirley W.

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y., who will return from Europe in time for the November JOURNAL. Dr. H. E. Kleinschmidt has been in charge of this department for September and October issues.

Wynne of New York City undertook some months ago to rid the radio of medical and health swindlers. Through the coöperation of local radio stations, he succeeded admirably, but local restrictions curtailed his ambition to sweep clean. Therefore, he advocated the compilation of an "Index Expurgatorius" for the guidance of broadcasting stations everywhere and appealed to the National Better Business Bureau for help. That organization, after more than 6 months' labor, classified a "Rogue's Gallery" of some 25,000 medical quacks, nostrum manufacturers and peddlers, diet inventors and other vultures.

The mellow, lifegiving sunlight of health education needs to be supplemented by the harsh spotlight of pitiless publicity.

When Is an Exhibit?—Every summer national health agencies receive appealing letters saying "I have been allotted space for a health exhibit at Blank County Fair. Please send me some good material." Generally Oscar, the office boy, mechanically rolls up an assortment of posters and sends them on. In due time these find their way to the booth with sundry unrelated posters elbowing each other for breathing space. But nobody cares!—except the genial chairman who says the exhibit is "nice."

According to the *Ohio Health News* of August 15, 1930, the Ohio Department of Health intends actually to "exhibit" its work at the state fair. Each departmental division is preparing a unit designed to tell John Jones what that division is doing and how it touches his life. For example, the unit on Roadside and Camp Sanitation will consist of models showing the proper installation of power and hand operated pumps. Experienced attendants will be on hand with a specially prepared pamphlet on the work of the department. We assume that the mosaic will be put together by a skilled showman, and we hope the effort will demonstrate what a real exhibit can be.

Precept Plus Example—A certain school principal insisted on serving coffee in the cafeteria in preference to milk because it was more economical. Meantime, the teaching staff were daily emphasizing the virtues of milk. So writes Dr. Phair, chief school medical officer of Ontario, who pleads for better correlation between preaching and practice. The best way to stimulate actual interest in personal health in the pupil-teacher is to provide a well rounded system of health service in the normal school. Such service improves the health of the future teacher and "carries with it the conviction of practicability." In addition, of course, the normal school should offer thorough training in the principles of health and the technic of teaching these principles. Dr. Phair's article, "Health Teaching in Normal Schools," was published in the *Canadian Public Health Journal*, May, 1930.

A Health Text Book—The Milwaukee Health Department issues an alluring textbook on "Home Hygiene and Care of the Sick," which is used to supplement class periods conducted by the department at social centers, settlement houses, and schools. Each of the twenty lessons is preceded by a brief statement of its aim and followed by a number of provocative questions. The instructions given are simple and practical. If bits of useless knowledge, such as how to make a mustard plaster or the advice that the sick attendant should not wear jewelry, seem to burden the book, that may be charged to this guest editor's harmless prejudices.

The book elicits comment in these columns because it is a very creditable home-made job. It was printed in the health department office by multigraph.

The sheets are of letterhead size on very heavy yellow-tinted stock. Only one side of the sheet is printed. This makes the book somewhat bulky. The sheets are bound with metal staples and covered with a cardboard stock of soft, marble-like tones.

It would be interesting to learn how the cost of production of this booklet would compare with a professional printing job. Its individuality, however, gives it a value which would be difficult to appraise. The Milwaukee Health Department offers a limited number to our readers free of charge. Write early.

The Milwaukee Health Department also prints in the same style a smaller manual on preschool clinics. Here both sides of the sheet are printed. The type does not press through and the effect is very neat. A limited number of copies free for early askers.

Jazz Typography on the Skids—J. L. Frazer, whose typographic judgments are recognized to be authentic, has for some time swung his cudgel against "modernism" in type. He uses the term in its commonest meaning; i.e., synonymously with "jazz," and believes the wave of bizarre typography in advertising is receding. *The Inland Printer*, of which Mr. Frazer is editor, restates in its August, 1930, issue eight typographical abominations which every user of type should shun:

1. Illegibility through the use of overblack and complex faces of type
2. Ugliness from the use of eccentric types
3. Ugliness through the combination of unrelated forms constituting an assault on common good taste
4. Geometrics as commonly applied in layouts and as also indicated in the excessive use of black patterns of varied shape which disgrace the name "ornaments" and keep the mind off the message in type
5. Excessive and excessively heavy rule work that, like other jazz features, tends to increase the cost of composition while placing a handicap upon readers which most of them will not attempt to overcome
6. Setting lines aslant, in curves, and vertically, instead of horizontally, as they are read
7. Illustrations which, like much modernistic typography, must be studied out
8. Composition sans capitals which disregards the part they play in denoting important words and making print more readily comprehended

Let the health publicist who creates printed matter and prescribes type and layout take notice!

Good Ideas—For a sample of attractive mimeograph work see the *Bulletin* of the Middletown (N. Y.) Board of Health. The July, 1930, number is a model of neatness and attractive arrangement. The illustrations are apt and exceptionally well done. It was prepared and mimeographed by Mildred Gillistin.

"My Daddy is the Health Commissioner" is the head line of a little poster illustrated by a series of six portraits of a charming little miss who tells how and why she was protected against diphtheria. It is issued by the Racine Department of Health. The department also uses a milk bottle collar as well as folders promising the people that "we are going to knock out diphtheria." Samples of this material may be obtained by applying to Dr. W. W. Bauer, Commissioner of Health, Racine, Wis.

They Say—

"No serum has done so much for public health as printers ink."—*Wis. Med. J.*

"Early Diagnosis or Early Grave."—*Health Briefs*—Tenn. Dept. of Health.

BOOKS AND REPORTS

Harvey W. Wiley. An Autobiography—*Indianapolis: Bobbs-Merrill,* 1930. 339 pp. Price, $5.00.

The recent death of the author at the ripe age of 86 years adds interest to his life story. He was born on a farm in Indiana, received his early education in the "old log school house," served in the Indiana Legion during the Civil War, later entered Hanover College, and finally graduated in Medicine from the Indiana Medical College in 1871. During his studies he discovered a special liking for botany and chemistry. A year after graduation he became a teacher of chemistry in his Alma Mater, and to prepare for this task, went to Harvard, where he came into contact with some of the great men of that time. For 9 years he taught chemistry at Purdue University, during which his interest in foods, their relation to health, and their adulteration increased steadily. In 1883, he went to Washington as Chief of the Bureau of Chemistry in the Department of Agriculture, a position which he held for 29 years.

Dr. Wiley's life was full of interesting events, but he will always be best known on account of the strenuous and prolonged struggle he made for the betterment of foods and the prevention of adulteration. This brought him into conflict with certain presidents, vice-presidents, cabinet officers, and appointed officials, to say nothing of the number of manufacturers who sought for years to get his scalp. The history of his fight for pure foods is one of the most heartening in the scientific annals of our country, and the part played by administrative officers, from certain presidents down the line, is one of the most sickening. Finally, Mr. Wickersham, then Attorney-General under President Taft, and now chairman of one of Mr. Hoover's many Boards, made charges against him of having conspired to defraud the government, and certified to President Taft that he was worthy of dismissal and "condign punishment." He was completely exonerated, and it will always be to President Taft's honor that he supported Dr. Wiley in his protection of the public.

He married when he was 66, and soon after, 1912, resigned from the Service. The union was blessed by two sons. The later years of his life were spent in giving public addresses on the Pure Food Laws, and doing editorial work for *Good Housekeeping*.

Dr. Wiley will always be known as a friend of the people and the Father of the Pure Food Laws of our country. It is interesting to note that almost coincident with his death, there is a scheme on foot by the present Secretary of Agriculture to allow adulteration with corn sugar without the fact being stated on the label.

The book is written in interesting style, and with the volume by the author which preceded it by a short time, *The History of a Crime Against the Food Law*, should be in the library of everyone who is interested in nutrition.

M. P. RAVENEL

Infant Nutrition. A Textbook of Infant Feeding for Students and Practitioners of Medicine—*By Williams McKim Marriott, B.S., M.D. St. Louis: Mosby,* 1930. 375 pp. Price, $5.50.

Proper nutrition is essential to good health at all ages, but it is particularly important in the crucial first years of life. Infant mortality is diminished when babies are competently fed with

pure milk products, administered by informed mothers under the direction of skilled physicians. This book should do much to assist practitioners in acquiring the scientific principles of infant nutrition. Out of an extensive clinical experience the author has produced a thorough, clearly expressed, logically arranged, and well illustrated work, which seems to contain all of the salient details regarding the feeding of well or sick infants.

In the 34 chapters of this book, the fundamental principles of infant feeding, such as the proper employment of the fats, proteins, and carbohydrates, the function of the vitamins and minerals, the technic of breast feeding, the requirements for artificial feeding, and the character of materials, are all set forth. An entire chapter is devoted to evaporated milk, and another to acid milk, both of which are much favored by this writer. Various physical disorders such as diarrhea, malnutrition, vomiting, colic, constipation, rickets, and other afflictions are also completely discussed in the various chapters.

This modern presentation of an important phase of public health ought to be of value to health officials and physicians who are directly concerned with baby clinics and infant feeding problems.

JAMES A. TOBEY

Die Statistischen Methoden. (Statistical Methods)—*By Karl Freudenberg. Berlin and Vienna: Urban and Schwarzenberg,* 1930. 558 pp.

This is one of a series of handbooks on method in biology, edited by Dr. Emil Abderhalden of Halle. It deals with descriptive and elementary analytical methods in medical statistics. Hence, on the side of subject matter, it includes what is commonly understood to be demography or vital statistics, some anthropometry, biometrics, certain branches of welfare economics, and other disciplines which do not ordinarily find their way into the existing texts available to our American students.

The elementary analytical-mathematical methods described by Dr. Freudenberg are drawn from the literatures of England, Austria, Germany and the Scandinavian countries. There is even a short, but satisfactory, description of the major methods and results of life, health and accident insurance statistics.

Because of its comprehensive scope the work should serve as an excellent first book for students of vital statistics. In many of the chapters, Dr. Freudenberg has brought his data down to 1928. The bibliography includes the accessible and pertinent texts on medical and social statistics in the German language. Unfortunately, the table of contents and index will not be available until the other parts in the hygiene handbook of the series are bound. A few descriptive table headings would have added to the usefulness of the book. Table heading technic seems to be faulty in most German and French statistical texts. Dr. Freudenberg has recently contributed to the *Journal of the German Society for Insurance Science* an attractive article on "Statistics and Causality" (March, 1930). Vital statistics and the personal insurances seem to be more closely allied in Germany than in other countries.

If one agree with certain Europeans that statistics is the art of reaching clear and profound conclusions from numerical data pertaining to a given field of interest, and gathered for this purpose (*Carl Burrau* in "Grundzüge der Versicherungsstatistik"), then Dr. Freudenberg's book promises to reward the student with an understanding of elementary "statistical method."

The text is not difficult to read, and the publisher has provided an attractive Roman type face. The book should find readers among vital statisticians in the United States; in a sense, it will be found to have antidotal properties.

E. W. KOPF

A Textbook of Hygiene—*By J. R. Currie. New York: Wood,* 1930. 844 pp. Price, $8.50.

We owe to England the great modern awakening in public health, and in many respects she still leads us in this branch of medicine. English books have some drawbacks for American readers, but the fundamental principles of hygiene are always the same, their application being modified by the surroundings. Therefore, one can read English books with pleasure and profit.

The aim of the author has been to meet the requirements of students in hygiene and public health under the medical curriculum, and at the same time to assist candidates in Parts I and II of the examination for the diploma in public health or degrees in sanitary science. We believe that he has succeeded in fulfilling his object in an unusually good manner.

Each section is followed by a statement of the legal enactments involved for England, Scotland and Wales. These laws do not interest the American reader particularly, though they may well be studied by our health authorities, and in many instances imitated. While the author distinctly disclaims any attempt to deal with the whole domain of hygiene, or to cover the field of modern public health administration, he has in an excellent fashion selected the important points for the students especially, but also for the practitioner who wishes to keep posted on the modern advances in sanitary science.

All of the subjects usually covered in such a volume are taken up in order and adequately treated. The sections on Food, Infectious Disease, and Helminthes, Insects, and Arachnida, are especially good. There is also an excellent section on Port Sanitary Administration, which has always been of especial importance to England on account of its enormous shipping and the significance of which has increased in all countries with the passing of the sailing vessel and the substitution of steam.

The book can be thoroughly recommended as one of the best in its class. The illustrations are abundant and good, and the printing and general make-up excellent. M. P. RAVENEL

Essentials of Pediatric Nursing—*By Ruth Alice Perkins, R.N. Philadelphia: Davis,* 1930. 364 pp. Price, $2.75.

The material in this book was arranged to meet the requirements of the course in pediatric nursing suggested by the National League of Nursing Education in the last edition of the curriculum.

Because of increasing interest in the study of the normal child, orthopedic and communicable disease nursing are omitted—since these are now given in separate courses—and extra time is devoted to principles of child psychology and to the care of the normal child.

There is an excellent bibliography, and questions and problems, brief but to the point, at the end of each chapter which a busy teacher will greatly appreciate, as she will also the Teaching Supplement in the back, which gives outlines of courses to be given by the supervising nurse or medical staff or both. As Joseph Brennemann, M.D., says in the foreword, the book is "safe, sane, and sound."

The typing is somewhat pale, but the material is well arranged with good topical headings. The illustrations are fairly plentiful and good, some of them in colors. EVA F. MACDOUGALL

Man vs. Microbes—*By Nicholas Kopeloff. New York: Knopf,* 1930. 311 pp. Price, $5.00.

To encompass within a volume of moderate size a comprehensive knowledge of all those minute forms of animal and plant life which are correctly but too seldom termed "microbes," and to do this in a style which shall be so en-

gaging that the popular mind will be instructed while being entertained, is the difficult task which the author has set himself.

How well he has succeeded will be a matter of opinion, for there will be some who will feel that science binds itself awkwardly to the particular kind of treatment which is here employed. Not every one wishes the modernistic method.

The title and some of the text suggest that man is at perpetual war with the microbic world, but there are places in the book where the author is at pains to explain that this is not so and that, in fact, some microbes are very useful while others are indispensable, that without them human life on the earth would be entirely impossible.

Where the matter has not been touched up to make it striking or amusing it is admirable. The author has taken a great deal of trouble to bring so much intrinsically interesting and useful information together.

A book of this scope is needed by every health officer. Schools and public libraries ought to have it. It will broaden the minds of those who read it, for its scope is broad. It is crammed with the knowledge with which man's relations with the microbes, good and bad, are carried on.

He who wishes to get the latest and best facts about the infectious diseases in the making of beer and wine and bread will find the book useful.

G. A. SOPER

A System of Bacteriology in Relation to Medicine—Volume II—*By C. H. Browning, W. Bulloch, J. H. Dible, A. Fleming, F. Griffith, et al. London: His Majesty's Stationery Office*, 1929. 420 pp. Price, $6.00.

Volume II of this 9-volume *System of Bacteriology*, sponsored by the Medical Research Council of England, deals with the cocci and the hemophilic bacteria. The first 5 chapters include the staphylococcus, the streptococcus, the pneumococcus, the gonococcus, and the meningococcus. Chapter 6 is devoted to the influenza group of organisms, while chapter 7 is a short presentation of whooping cough and *Bacillus pertussis*, chancroid and *Bacillus ducreyii*, conjunctivitis, *Bacillus lacunatus* and other organisms.

In general, each chapter covers: history, morphology, cultivation, biochemical reactions, vitality, distribution, pathogenicity, resistance, classification, and treatment. The organization is such as readily to permit assimilation of facts.

One hundred and thirty-four pages are devoted to the streptococci. They are presented under four main divisions —the hemolytic, the mouth, the bowel, and the anaerobic streptococci. An excellent table is given which summarizes the characteristics by means of which the mouth streptococci can be differentiated from other streptococci and the pneumococci. The diseases related to streptococcal infections are presented.

One feels grateful for the clear presentation of the confusing literature on the serological races of pneumococci. The account of the serums, vaccine, and chemotherapy of pneumonia gives the present incomplete knowledge of their efficacy, and the problems still to be solved before definite conclusions can be reached.

The chapter on the influenza group of organisms, of which *B. influenza* (Pfeiffer) is the most important member, includes those organisms which require for permanent cultivation on artificial mediums accessory substances present in blood and in fresh vegetable tissue. After discussing the etiology of influenza the author concludes:

> It is obvious from all that has been said that, at present, the diagnosis of influenza by bacteriological methods has no sure foundation. Neither the apparent absence nor the

finding of the influenza bacilli in the respiratory passages gives an unequivocal answer (p. 374).

Each chapter includes a good bibliography. This volume will be of great value to the student and research worker as well as to the practitioner who desires to remain correctly informed as to the bacteriological advances that have been made concerning these organisms in recent years. ESTHER W. STEARN

Military Preventive Medicine—*The Army Medical Bulletin, No. 23—By George C. Dunham, M.D., Dr.P.H., Major, Medical Corps, U. S. Army. Medical Field Service School, Carlisle Barracks, Pa.*, 1930.

The fundamentals of hygiene and preventive medicine are, of course, the same under all conditions. The medical officer in an army camp suffers from certain disadvantages, but is in some ways much better off than his brother in civilian life. On the other hand, we have large numbers of men, drawn from extensive areas, rapidly brought together, bringing with them various contagious diseases from the many sections which they represent. The military officer is more or less independent of local laws, and has absolute control, though sometimes hampered by long-distance, machine-made regulations issued from Washington by some incompetent swivel chair endurance sitter. While the contact is often much more direct and more close than in civilian life, control is more easily carried out.

The great point which is emphasized by a book such as the one before us is that all officers of the Army, medical as well as line, and the people in general have come to realize that the Medical Service of the Army is the agency upon which its efficiency largely depends. During the World War this was impressed on everyone. The saddest failure of England was the Mesopotamian campaign, in which the chief medical officer was overruled and even threatened with court-martial by the line officer in command. At present, the medical officers of the Army are the most trusted consultants of the commanding officers.

The volume before us, consisting of 1,000 pages, exclusive of the index, which is good, is proof of what has just been said. It is written to provide the officers of the Medical Department of the Army with information which will assist them in their inspection and studies, and in carrying out measures to protect and promote the health of the troops. Especial attention is given to the epidemiological factors which exist among troops and to the environmental features met with under Army conditions.

Though the author states that he has made no attempt to cover the entire field of preventive medicine, it may be said that there are few subjects which have been left unconsidered. The disposal of garbage and human excreta of all kinds necessarily occupies considerable space, and excellent illustrations of the various types of emergency incinerators, folding and transportable receptacles, and knockdown latrine boxes are given.

The section on the control of vermin and insects is especially full and practical.

The book can be commended without reservation. The product shows that no better man than the author could have been selected for the task. Medical affairs in the Army advanced tremendously between the Spanish-American War in 1898 and the World War in 1917. Except for the epidemic of influenza, our Army showed a record which has never before been equaled in the world. The control of all diseases about which we had adequate knowledge was nothing short of marvelous.

The book is published by the government and is, unfortunately, not for sale. It is to be distributed to officers of the

Army, leading journals, schools and libraries in the United States. We wish that it could be put on general sale.

M. P. RAVENEL

Children at the Crossroads—*By Agnes E. Benedict. New York: Commonwealth Fund,* 1930. 238 pp. Price, $1.50.

Here is a book that will be of interest both to the optimist and to the pessimist. The one will see in it what can be accomplished by painstaking, resourceful effort in rehabilitating children who, for one reason or another, are on the wrong track; the other will be impressed by the time, the effort and money that must be expended to bring about the desired results.

Which of these two points of view is the sounder is, of course, a matter of opinion. There is no doubt, however, that this readable story of results accomplished by rural visiting teachers working under the Commonwealth Fund grant will stimulate thought on the part of all interested in the development of agencies to deal with the misfit child.

It will undoubtedly occur to the unregenerate while reading this book that much time could be saved if public opinion were not so slow and squeamish about dealing with the worthless parent, as in the case of Tim Noonan.

On the other hand, the thought may occur to those interested in administrative matters that much of the work of the visiting teacher as depicted here might well be that of the visiting nurse, the mental hygienist, or the social worker. Are we developing many different agents to do work which might well be done by one with a little adjustment in training?

I have said that this is a readable book; it is. A sufficient number of case histories are used to give vividness to the application of general principles to the specific problem of salvaging misfit children. "Getting Caught" sounds like the title of a thriller but its application is found in a discussion of Community Factors in Maladjustment. Other chapters deal with The Rural Child at Home and in School, Visiting Teacher Work in a Rural Setting, and Group Work in School and Community.

A commendable feature of the book is its frankness; it discusses failures as well as successes.

MERRILL E. CHAMPION

Science in the Service of Health—*By Elliot R. Downing, Ph.D. New York: Longmans, Green,* 1930. 320 pp. Price, $2.00.

This is one of Longmans' School Science Series, edited by the author of the present volume. It is one of the many books written by laymen which have appeared during the past few years on subjects which are largely medical.

Practically it may be divided into two parts, the order of which, in our judgment, would better have been reversed. Six chapters are devoted essentially to bacteriology and its effects on the welfare of mankind. The remaining six chapters are given largely to the human body and its functions, but include such discoveries as the vitamins, insulin and the effects of the endocrine glands. An appendix is devoted to demonstrations to which reference is made in the several chapters.

The book is written in popular language; the facts are correctly stated; and a great deal of interesting history is given. There are some unfortunate misprints, as Detafond for Delafond, and Finley for Finlay. Some of the most interesting histories, like that of anthrax, for example, which was the first germ ever proved to be the cause of a disease, and the study of which has taught us much about bacteriology, are inadequate.

In general, the book belongs to the better class of its kind. The printing is excellent.

M. P. RAVENEL

History of Haitian Medicine—*By Robert P. Parsons. New York: Hoeber,* 1930. 196 pp. Price, $2.25.

The medical history of Haiti since the American Occupation in 1915 vies with the history of the U. S. Army as an object lesson in what modern preventive medicine can do. This beautiful island, "The Flower of the Antilles," has been blessed in almost every way by nature, but was exploited by man with little regard for anything else than profit for many years. Slavery existed in the island for 292 years, during which every type of disease found in Africa was brought in and found there a suitable soil. There came also African superstitions, like voodooism, which hindered rational prevention.

Practically everyone in the rural population has suffered from malaria, yaws, and intestinal parasites. The Caribs disappeared during the period of exploitation by the Spanish, within 60 years; many of them were worked to death, many murdered outright, but most of them died from smallpox—some 200,000 within 10 years of the landing of Columbus in 1492.

Independence came to the island in 1804, at which time the French commanding general died of yellow fever, and the disease caused such ravages in his army that it was virtually defeated by that disease. Smallpox is apparently the only disease which was not introduced from Africa. This was brought by the whites.

Yaws, "the blood brother of European syphilis, if not the same disease modified by age incidence, social environment, and racial difference," was the great physical curse of Haiti, and until the advent of Dr. Wilson in 1922, its significance does not seem to have been recognized by anyone. Dr. Wilson insisted that the first need of rural Haiti was "soap, salvarsan and sunshine."

The National Public Health Service of Haiti was organized by Captain N. T. McLean (M. C.), U. S. N. Others, like Drs. Laning, Ebert, Wilson and Butler, played a leading part in the redemption of the island. Among the Haitians, Drs. Dehoux and Audain deserve especial mention.

The author has performed his task in an unusually good fashion. The book reads like a novel. Apart from its inherent interest in telling of the redemption of a worthy people from disease, it should be in every medical library, and constantly quoted as an outstanding example of one of the great triumphs of modern medicine.

M. P. RAVENEL

Personal Hygiene for Nurses—*By Seneca Egbert, M.D., Dr.P.H. Philadelphia: Davis,* 1930. 347 pp. Price, $2.50.

This book is written for student nurses to be used "at the beginning of their course in the training school." However, it is not so closely tied up with nursing that it could not be used just as profitably by college freshmen.

The book is sane and sound, and Dr. Egbert's approach to personal hygiene in Chapter III where he treats of the care of the body in its relation to the importance of an attractive personality is especially to be commended. The esthetic always has a strong appeal in presenting this subject to young women. Here charm is discussed from the point of view of posture, skin, cleanliness, bathing, the hair, and the teeth.

In later chapters on The Heart, Respiration, Excretion, Senses, Organs, etc., the author gets rather technical and uninteresting. Much more space seems to be given over to anatomy and physiology than to the details of personal hygiene as they apply to nurses.

In the chapter on "The Nurse as a Teacher" most public health nurses would smile at the paragraph in which the author says, "There are, however,

other branches of the profession than only that of the private nurse. Thus we have the school nurse, the public health nurse, and the industrial nurse." He evidently looks upon the rural or county nurse as the public health nurse, when he should include the school and industrial nurse as well in this category. Nothing is said about the additional training necessary to fit a graduate registered nurse to be a well qualified public health nurse.

An excellent series of questions follows each chapter and also a brief bibliography. EVA F. MACDOUGALL

The Bureau of Home Economics. Its History, Activities and Organizations—*By Paul V. Betters. Washington, D. C.: The Brookings Institution,* 1930. 95 pp. Price, $1.50.

This belongs to the Service Monographs of the United States Government, No. 62. "The Brookings Institution—Devoted to Public Service through Research and Training in the Humanistic Sciences"—was incorporated on December 8, 1927, its first purpose being to aid constructively in the development of sound national policies, and the second to offer training of a supergraduate character to students of the social sciences.

The many bureaus of our national government and their overlapping have been the subject of many discussions, political as well as otherwise. The Brookings Institution, the full history of which cannot be here given, has been of notable service in telling the people of the country what is going on in Washington in the many bureaus and departments located there.

The Bureau of Home Economics was established July 1, 1923, before which many of the activities it now carries on had been administered in the Department of Agriculture. In the 7 years of its existence, it has grown from a small investigational unit with a staff of 4 or 5 persons to an organization employing 71, and the appropriations have increased from $71,760 in 1924, to $167,500 in 1930.

As this is a concise and detailed description of the activities of the bureau, a review is hardly possible. The chief activities are Food and Nutrition Investigations, Textile and Clothing Research, Textile Utilization and Maintenance Work, Sewing Survey and Garment Fitting Study, and Economic Studies. An appendix gives the publications which have been put out from the bureau.

The study is wholly descriptive in character, and no attempt has been made to subject the facts to criticism, nor to indicate changes which might be made with advantage. The object is to enlighten the public and legislators as to actual facts—and as such, the book can be commended. M. P. RAVENEL

Psychology for Executives—*By Elliott Dunlap Smith. New York: Harper,* 1928. 262 pp. Price, $3.50.

An interesting introduction by Henry S. Dennison of the Dennison Manufacturing Company, Framingham, Mass., where the author is Division Manager (he is also a Lecturer at Harvard University), states that learning how to manage men and how to work with them so as to get the best there is in them is of first importance to business men. The book is claimed to deal with psychology in the spirit of the engineer, and the author was a manager before he became a psychologist.

Seven chapters compose the body of the book:

I. Why Men Are and What They Are—the capacity of mankind to learn, how much is inborn and how much acquired, with a valuable discussion of "intelligence tests," and how far "human nature" can be changed.

II. Habits and How to Handle Them—developing by chance or by choice, with an

elaboration of ten precepts on correct habits.

III. Habit and Thought—memory and how to train it, the power of association, attention, etc.

IV. The Forces of the Personality—its multiplicity.

V. The Problem of Self-Control—rebellious desires, self-deception—"I am doing as much as I am paid for"—self-respect, inner conflicts and outraged desires as employment problems.

VI. The Effect of the Group in Industry—an interesting discussion of whom to advance or transfer, industrial strife and fears, and the problem of discipline.

VII. The Integration of Conflict and Methods of Analysis.

There is an Appendix on suggestions for studying and teaching practical psychology in which the author advocates the problem method rather than lectures, assigned readings, and tests. Also, an Appendix on "Good Books on Psychology" with a brief characterization of each.

To one interested in employment and personnel problems this book is highly instructive, easy reading, and filled with many practical features gained from experience. It is indeed an industrial psychology developed out of successful management. EMERY R. HAYHURST

Hitch-Hikers—*By W. W. Peter, M.D., Dr.P.H., and Grace T. Hallock. New York: Cleanliness Institute,* 1930. 56 pp. Price, $.20.

This is a small, elementary textbook on the communicable diseases entering the body via the mouth and nose. The idea of the germs of disease being passengers, on most of the objects in use in daily life, is maintained throughout, thus justifying the title.

Careful details are given of the possibilities of contagion through air, solid food, water, milk and incidental routes, each subject being treated in a separate chapter with a convenient summary at the end. Emphasis is constantly laid upon methods of disease prevention.

The booklet is well printed and profusely illustrated with photographs and diagrams, and should be a welcome aid to those who are concerned with the teaching or study of the elements of public health. JOHN HALL

BOOKS RECEIVED

PRINCIPLES OF HYGIENE. By Thomas A. Storey. Stanford University: Stanford University Press, 1930. 475 pp. Price, $3.50.

THE MORPHINE HABIT. By G. Laughton Scott. New York: Wood, 1930. 94 pp. Price, $2.25.

PROCEEDINGS OF THE TWELFTH TEXAS WATER WORKS SHORT SCHOOL. Abilene, Texas, January 27–30, 1930. 189 pp. Price, $1.00.

THE PRINCIPLES AND PRACTICE OF HYGIENE. By Dean Franklin Smiley, Adrian Gordon Gould and Elizabeth Melby. New York: Macmillan, 1930. 415 pp. Price, $2.50.

HIERONYMUS FRACASTORIUS. CONTAGION, CONTAGIOUS DISEASES AND THEIR TREATMENT. By Wilmer Cave Wright. New York: Putnam, 1930. 356 pp. Price, $4.50.

ADOLESCENCE. STUDIES IN MENTAL HYGIENE. By Frankwood E. Williams. New York: Farrar & Rinehart, 1930. 279 pp. Price, $2.50.

TROPICAL MEDICINE. Alfred C. Reed. Philadelphia: Lippincott, 1930. 410 pp. Price, $6.00.

BIOGRAPHICAL SKETCHES AND LETTERS OF T. MITCHELL PRUDDEN, M.D. 1849–1924. New Haven: Yale University Press, 1927. 311 pp. Price, $2.00.

PROBLEMS AND METHODS OF RESEARCH IN PROTOZOOLOGY. Edited by Robert Hegner and Justine Andrews. New York: Macmillan, 1930. 532 pp. Price, $5.00.

PIONEERS OF PUBLIC HEALTH. By M. E. M. Walker. Edinburgh: Oliver & Boyd, 1930. 270 pp. Price, $5.00.

SEVENTY BIRTH CONTROL CLINICS. By Caroline Hadley Robinson. Baltimore: Williams & Wilkins, 1930. 351 pp. Price, $4.00.

THE CHILD FROM ONE TO SIX. By Ada Hart Arlitt. New York: McGraw-Hill, 1930. 188 pp. Price, $2.00.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH. D.

Professional Training of Sanitarians—A symposium setting forth the British view of adequate hygienic training for medical students, graduates in public health, sanitary inspectors, health visitors. All of interest to American educators.

BUCHAN, G. F., *et al.* The Education of Health Personnel. J. Roy. San. Inst., 51, 2: 73 (Aug.), 1930.

Industrial Nutrition Work—How undernourished employees in one industry are induced to undergo an adequate diet is interestingly told.

COMSTOCK, L. Selling Proper Nutrition to Industrial Workers. P. Health Nurse, 22, 8: 406 (Aug.), 1930.

Toxoid or T–A Mixture?—The findings of the National Institute of Health are noteworthy. "(1) In 475 school children diphtheria toxoid gave an immunity response, as measured by the Schick test, of 95 per cent as compared with 64 per cent in 355 children receiving 0.1 L + dose toxin-antitoxin mixture. (2) No local or general reactions were reported in children receiving toxoid; those giving reactions to intracutaneous test injections of diluted toxoid having been removed from the group. (3) Two doses of 1.0 c.c. each, with an interval of 1 month, produced a negative Schick reaction in a high percentage of subjects."

HARRISON, W. T. The Immunizing Value of Diphtheria Toxin-Antitoxin Mixture and Diphtheria Toxoid. Pub. Health Rep., 45, 33: 1883 (Aug. 15), 1930.

Rickets Prophylaxis—This report illustrates the problems involved in determining the prophylactic dose of viosterol. Larger doses than those formerly recommended seem to be in order. No important differences between viosterol and cod liver oil were noted within the limits of this investigation.

HESS, J. H., *et al.* Viosterol (Irradiated Ergosterol). J. A. M. A., 95, 5: 316 (Aug. 2), 1930.

Ergosterol and Cod Liver Oil—The antirachitic potency of the irradiated ergosterols tested varied greatly, and the best had less than 60 times the antirachitic activity of the best cod liver oil.

HOLMES, A. R., and PIGOTT, M. G. The Relative Antirachitic Activity of Cod Liver Oil and Irradiated Ergosterol (Viosterol). New Eng. J. Med., 203, 5: 220 (July 31), 1930.

Childhood Nutrition—"There appears no reason to conclude that a scientifically balanced milk diet, including 1½ pints to 1 quart of milk a day per child, produces greater growth or better health in growing children from 7 to 15 years than a scientifically chosen vegetable diet furnishing a smaller amount of calcium."

LANE, D. E., and BOSSHARDT, F. H. Nutrition of Children on a Mixed and on a Vegetable Diet. Am. J. Dis. Child., 40, 2: 285 (Aug.), 1930.

Milk-Borne Sore Throat—Another epidemic laid to raw milk, this one an explosive outbreak numbering 187 cases, was caused by dairy workers who apparently infected the milk directly.

LANE, E. A., and ANDERSON, G. W. An Outbreak of Milk-Borne Sore Throat. New Eng. J. Med., 203, 7: 324 (Aug. 14), 1930.

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Pasteur treatment with which every health officer should be familiar.

McCoy, G. W. Antirabic Vaccine Paralysis. Pub. Health Rep., 43, 33: 1888 (Aug. 15), 1930.

State Health Administration—This report of a health survey of Iowa is in reality a valuable discussion of health organizations for rural states.

McLaughlin, A. J. A Public Health Survey of Iowa. Pub. Health Rep., 45: 28 (July 11), 1930.

Cross Connections Cautiously—A clear, concise statement of the reasons for, and the dangers of, cross connections and how the danger may be eliminated.

Mowry, C. W. A Practicable Program for the Elimination and Control of Cross Connections. J. Am. Water Works Assn., 22, 8: 1061 (Aug.), 1930.

Preventing Childhood Tuberculosis—Canadian experience in the French scheme of placing children from tuberculous homes, but not yet suffering from the disease, in country foster homes is reported as most successful.

Nadeau, E. The Grancher System, as Applied in the Province of Quebec, for the Protection of Childhood against Tuberculosis. Canad. Pub. Health J., 21, 8: 382 (Aug.), 1930.

Experimental Water Treatment—The city of Ottawa built a trial water treatment plant to determine the conditions and problems involved before the needed municipal filtration system was installed. Such municipal foresight seems unaccountable. The record of the research is most interesting.

Nasmith, G. G. The Trial Filtration Plant, Ottawa, Canada. J. Am. Water Works Assn., 22, 8: 1017 (Aug.), 1930.

The Health of the Worker—Despite improved sanitary conditions and public health service, British industrial experience indicates an increasing duration of illness and recovery from accidents. The reasons for these phenomenons are discussed.

Oliver, G. The Health of the Worker Today. J. State Med., 38, 8: 454 (Aug.), 1930.

Symposium on Arthritis—The present status of the problem, diagnosis, vaccine treatment, other biologic products, bacteriologic studies, nutritional factors, and British administrative projects are all included in this fine series of papers which seem to be the last word on this much discussed subject.

Pemberton, R., *et al.* Symposium on Arthritis. J. Lab. & Clin. Med., 15, 11: 1055 (Aug.), 1930.

Hookworm Eradication Status—The hookworm situation has passed the initial stage of an unique project and has now become a part of the routine of southern clinicians and health officials. Mass treatment without full consent of parents and physicians is highly inadvisable.

Stiles, C. W. Decrease of Hookworm Disease in the United States. Pub. Health Rep., 45, 31: 1763 (Aug. 1), 1930.

Interstate Carriers' Water Supplies—What the U. S. Public Health Service is doing to supervise and certify the drinking water used by interstate carriers makes an effective story of real accomplishment.

Tarbett, R. E. Certifying Water Supplies for Interstate Carrier Use. J. Am. Water Works Assn., 22, 8: 1102 (Aug.), 1930.

Anaphylaxis—Serum reactions are more common with concentrated serum than when unconcentrated diphtheria antitoxin was used. The author believes that the increased sensitivity is not all due to the prophylactic use of toxin-antitoxin mixture.

Toomey, J. A., and August, M. H. Reactions Following Administration of Diphtheria Antitoxin and Toxin-Antitoxin; Results of Desensitization. J. Prev. Med., 4, 4: 281 (July), 1930.

HEALTH DEPARTMENT AND OTHER REPORTS

IRA V. HISCOCK

League of Red Cross Societies—Public attention is being drawn to the problem of blindness. How can human eyesight be saved? It is a matter of common knowledge, but one to which too little thought is given, that there is a belt of countries encircling the world in which the inhabitants are either threatened with blindness or suffering from grave forms of ocular disease; the whole of Northern Africa, including Morocco, Algeria, Tunis and Egypt, the vast expanse of India and the alternately sparsely and densely populated territory of the Chinese Republic are included in this belt. In Western Europe the leading industrial countries, which are now almost immune from certain diseases as a result of the progress made in preventive medicine, have noted a marked increase in the number of accidents resulting in eye injuries. An American ophthalmologist was no doubt thinking of these countries when he declared that "external injury constitutes the most important cause of blindness through the greater part of life."

Among this multitude of unfortunate human beings who have either lost their sight or are threatened with blindness, there are some who could recover their sight if given suitable treatment; there are a far greater number who could be saved from impending blindness. How can this be achieved? This question is answered in the report published by the International Association for the Prevention of Blindness. This document gives figures showing the deplorable amount of blindness in the world and its geographical distribution; in round figures, the blind population of the different countries is given as follows: 500,000 in China, 1,500,000 in India, 76,000 in the United States, 53,000 in Great Britain, 36,000 in Germany, etc. It has been estimated that 95 per cent of the native population of Egypt suffer from trachoma, while 90 per cent of the school children in Southern Tunis are afflicted with this disease. Up to the present, the vastness of this problem has been a deterrent to initiative. Setting aside these figures, there can be no doubt that the problem of blindness is far from being insoluble; in the majority of cases blindness is caused by avoidable accident or common forms of disease against which we are powerfully protected: smallpox, trachoma, purulent ophthalmia. Too great insistence cannot be laid on the assertion that blindness can be prevented in the great majority of instances.

Hygienic Institute—The 15th report of the Hygienic Institute for the period ending December 31, 1929, is well illustrated and contains much valuable material from an administrative standpoint. It may be recalled that this health organization serves La Salle, Peru and Oglesby. The Tri-City Tuberculosis Society coöperates with the health department in the prevention of tuberculosis and has placed a scale in each of the 23 schools of the communities served, in addition to other provisions.

One nurse is maintained by that organization to work under the direction of the supervisor of nurses at the Institute. The Boards of Education maintain a school nursing program by contributing funds toward the salaries of the school nurses, and the cities also make substantial appropriations for the conduct of the work, in addition to the funds derived from endowment. The Metropolitan Life Insurance Company

has arranged to furnish nursing service to its policyholders through the Institute, which will receive 75 cents per visit.

The year 1929 showed some of the most satisfactory death rates ever recorded; the general death rate being 9.2, corrected for residence 8.3, while infant mortality fell to a rate of 56.3. An interesting table on office and administration activities shows in detail these time-consuming activities which frequently are not recorded by health administrators. Among other items, it is noted that there were 1,102 visitors to the Institute during the year, and 3,336 telephone calls were received, in addition to some 2,000 such calls made.

School physical examinations were made of 2,095 pupils of the 1st, 3d and 5th grades, 1,975 pupils having been found with defects and 2,735 corrections having been made. The report cites the development of certain new educational projects which are worthy of note, including Health Button Contests among school children, and open-window room methods. Disbursements totalled $38,-863 in this district of 30,000 people. The health officer states that while this budget compares favorably with most communities, it is yet not sufficient to meet the full demands of modern public health requirements.

Johannesburg—Johannesburg, with an estimated population for 1929 of 350,500, records a white birth rate of 25.9. The native and colored births registered numbered 1,920, but as the ratio of females to males in these population groups is only 1 to 7, the report points out that it would be misleading to suggest a birth rate. The death rate for all persons from all causes for the past year was 14.9, the rate for white persons being 11.1. Marked improvements are noted in infant mortality rates, due unquestionably to the extension of maternal and infant welfare activities and the provision of adequate prenatal facilities in the form of nurses and clinics. The report contains many valuable statistical tables and interesting graphs, accompanied by appropriate descriptive text.

Athens, and Clark County, Georgia—The annual report for the period ending June 2, 1930, is written in an unusually interesting style, and if the size of type were somewhat larger, this report would doubtless be read by a large audience.

During 1929, the negro death rate in the county exceeded the birth rate in the ratio of 182 to 174. Figures are presented to show that among white babies it may be expected that 43 out of 1,000 will not reach their first birthday, as contrasted with 119 for the colored. Considerable progress is noted in the improvement of milk supplies.

New Britain, Conn.—The 1929 report is well printed in type adapted to the soft dull coated paper, easily read. A birth rate of 17.7, a general death rate of 8.3, and an infant mortality rate of 55.7 are recorded. A venereal disease clinic was opened during the year.

An expenditure of 82 cents per capita is noted, but garbage collection accounts for 37 cents of this amount. In this city with a population of 74,240, there were 2,479 laboratory examinations made and 1,127 packages of biologics distributed last year. Wassermann tests are made in the state laboratory. The report concludes with pertinent recommendations by the health officer for future developments, including an isolation hospital, a diphtheria prevention program, a scoring system for dairies, and separation of garbage collection costs from the health budget.

Elizabeth, N. J.—On the basis of a 1929 population of 117,633, a death rate of 9.8 and a birth rate of 17.0 are re-

corded. Infant mortality has dropped from a rate of 165 in 1911 to 64.7 in 1929.

Prenatal cases are visited monthly by the child hygiene nurses when an early engagement of an attendant is urged, together with frequent visits during pregnancy. After the birth of the child, mother and baby are visited weekly for the first month and special stress is laid on maternal nursing. There are 27 licensed midwives who are visited monthly by the supervisor for inspection purposes. It is reported that members of the Union County Midwives Association coöperate well with the health department.

Parochial school health work is carried by the health department, as are dental clinics for school children. Four venereal disease clinics are maintained where 5,518 treatments were given. Home visits for follow up of V. D. cases numbered 643. Approximately 50,000 quarts of milk are sold daily in the city, of which 87½ per cent is pasteurized.

Kent and Queen Anne's Counties, Md.—The frontispiece of the 1929 report of the Kent and Queen Anne's County Health Department is a plan of the proposed child health center building for Queen Anne's County, to be erected some time during the year. The building will supply offices for the health officer and nurse, as well as special clinic rooms, operating room, and wards. A new health center is also being erected in Chestertown, Kent County, which will house the health officer and nurse and will contain rooms for the various clinics and will be equipped with modern and up-to-date appliances. One feature will be a complete dental equipment. The full-time staff consists of a Deputy State Health Officer, 2 white (1 in each county) and 1 colored nurse, and secretary.

The activities of the Deputy State Health Officer, the colored nurse and the secretary are financed by the State Department of Health. The work of the white nurses is financed by the County Commissioners, the County Public Health Association, and the Maryland Tuberculosis Association. Each county has a part-time county health officer, who is a practising physician, and several part-time clinicians.

Maternal and infant death rates being high, close supervision of midwives is maintained. Each midwife is supplied with a complete obstetrical outfit which is inspected regularly by the county nurse. Classes for midwives are held each year. The school health program in the two counties is based on close coöperation between the Deputy State Health Officers and the Superintendent of Education, and calls for a physical examination of every white and colored child in Kent and Queen Anne's Counties. A chest clinic, a child health conference, and an eye, ear, nose and throat clinic are held monthly in each county. Annual mental and orthopedic clinics are also held in each county.

NEWS FROM THE FIELD

NEW YORK STATE SEWAGE WORKS ASSOCIATION

THE fall meeting of the New York State Sewage Works Association was held at the Onondaga Hotel, Syracuse, N. Y., September 13, 1930.

C. A. Holmquist, President, presided and paid tribute to the memory of Kenneth Allen, founder and first president of the Association.

Following a brief business meeting, two papers were presented, one on "Chlorine Uses at Sewage Plants" by L. H. Enslow of the Chlorine Institute, and the other on "Stream Pollution from the Operator's Standpoint" by Professor E. B. Phelps of Columbia University.

TEXAS PUBLIC HEALTH ASSOCIATION

THE Texas Association of Sanitarians, at its eighth annual short school, August 26–28, changed its name to the Texas Public Health Association. Dr. H. K. Read, supervisor of hygienics in the public schools of Houston, was reëlected president. Other officers chosen were: vice presidents Jack Wyatt, Amarillo, Dr. T. A. Ward, Beaumont, W. N. Dashiell, Fort Worth, and Celia Moore, Austin; and E. G. Eggert, sanitary engineer for the state department of health, was reappointed secretary.

J. C. Anderson, M.D., state health officer of Texas, was honored by the Association as "a man who has accomplished more for the health of Texas in his unselfish way than, perhaps, any other man." Dr. Anderson was presented with a billfold as a token of appreciation of his services and accomplishments, which were outlined briefly in a presentation speech by Dr. Read.

Houston was selected for the 1931 meeting city. Dallas, Austin, Waco, and other cities had extended invitations to the short school. Among the resolutions adopted was one placing the association in favor of simplification of all plumbing codes.

The organization also went on record for encouragement of proper methods in collecting and disposing of garbage and recommended a permanent program of rat-proofing by incorporating a section of this phase of public health in all building codes.

By resolution the sanitarians endorsed and pledged support to the standard milk ordinance program.

MICHIGAN CONFERENCE

ON September 11 and 12 the Upper Peninsula Conference on Public Health and Tuberculosis was held in Marquette under the auspices of the Michigan Public Health Association and the Michigan Tuberculosis Association.

THE BURKE FOUNDATION

A BUILDING for recreational therapy and remedial social activities will shortly be opened in connection with the Convalescent Institute of the Burke Foundation at White Plains, N. Y. This will release more bed space for women patients.

CHILD STUDY ASSOCIATION

A THREE-DAY conference with Round Table Discussions will be held October 20–22 at the Hotel Pennsylvania, New York, N. Y., under the auspices of the Child Study Association of America.

The Conference will be opened with

a dinner, October 20, the subject of which will be "The Family and Fulfillment of Personality." Dr. Frankwood E. Williams will be Chairman. Speakers will be Dr. Hornell Hart, Dr. Beatrice Hinkle, Dr. H. E. Barnard, and Dr. Eduard C. Lindeman.

BI-CO-LI

THE Order of the Bi-Co-Li will meet at the Texas Hotel, Fort Worth, Tex., during the A. P. H. A. Convention.

MENTAL HYGIENE INSTITUTE

THE Philadelphia Hospital, Philadelphia, Pa., announces the opening of its Institute for Mental Hygiene. The Institute is planned for patients who will meet the physicians more than half-way in recognizing that they need help—for fatigue, worries, fears, maladjustments, difficulties in getting on with other people or at their work. The services are for both out-patients and resident patients.

The Institute will try to furnish an actual cost-of-care service designed to give people of moderate means every essential of good treatment including privacy and choice of physician, but with no element of charity.

ROCKY MOUNTAIN SPOTTED FEVER

DR. R. R. Spencer, U. S. Public Health Service, was awarded the Gold Medal by the American Medical Association in annual session at Detroit in June, 1930, for original work in the preparation of a vaccine against Rocky Mountain spotted fever.

A 5-year record of practical prevention of Rocky Mountain spotted fever achieved by Dr. Spencer was the basis for the award of the medal.

Until 1924 laboratory workers knew no special prophylactic inoculation, and of 16 exposed 6 contracted the disease and all died. Since 1924 there have been 59 laboratory workers all of whom have received prophylactic inoculation and among these there have been 7 cases all of whom recovered, except 1 who received only one of the two requisite prophylactic doses.

FELLOWSHIP IN CHEMICAL RESEARCH

THE Secretary of the Treasury has recently accepted a gift of $100,000 offered by the Chemical Foundation, Inc., through its president, Francis P. Garvan, under the provisions of the Act of May 26, 1930, which authorizes the government to accept donations and to create a system of fellowships, etc., in the National Institute of Health. The condition is made that the income from this fund be used for one or more fellowships in basic chemical research in matters pertaining to public health, the details of which are left to the Surgeon General and his Advisory Committee.

FLIGHT DOCTORS' COURSE

A POSTGRADUATE class in aviation medicine and surgery, believed to be the first of its kind, will be offered next fall by the University of California. The new course is to deal with all phases of a flight surgeon's work.

Colonel Edward L. Munson, 9th Army Corps surgeon, and Colonel W. A. Powell, professor of medico-military science, will direct the course for the university's medical school.

AMERICAN EDITORS' AND AUTHORS' ASSOCIATION

THE American Editors' and Authors' Association, in convention at Detroit, Mich., June 24, 1930, adopted a resolution recommending the creation of a Portfolio of Public Health in the Cabinet, and that a copy of the resolution be forwarded to the Secretary of State, Washington, D. C., to the secretaries of all national and state medical organizations, and to all members of the said association.

SMALLPOX PRACTICALLY EXTINCT IN BULGARIA AND HUNGARY

SMALLPOX in Bulgaria and Hungary where vaccination is compulsory is apparently almost extinct. Its rarity is evident from the fact that Dr. A. Petrillo, of the State Hygienic Institute of Budapest, and Dr. Ilia G. Minoff, a public health official of Bulgaria, who were visiting health organizations in New York State, said that they had never had an opportunity of seeing a case of smallpox in their native countries.

Dr. Petrillo asked if there had been any recent cases in the state. He was informed at the time that reports of smallpox were being received from a community in the southern section and that if he left immediately he would be able to see patients in various clinical stages. In the course of a week he visited, with the district state health officer, a large percentage of the 39 cases which occurred in one community during this outbreak. None of these cases had ever been vaccinated.

GEORGE ROBERT WHITE FUND

THE Sixth Health Unit, established from the income of the George Robert White Fund, was dedicated and presented to the City of Boston on September 15.

PERSONALS

DR. J. T. AINSLIE WALKER, of London, died suddenly on July 27. Dr. Walker is best known in this country for his pioneer work in the standardization of disinfectants. In collaboration with Dr. Samuel Rideal, he gave us the first really satisfactory method for determining the comparative value of disinfectants, their method being known as the Rideal-Walker Test. After the recent war, Dr. Walker formed the Ainslie Walker Laboratories, Ltd., for the purpose of carrying on research and chemical manufacturing, principally in the disinfectant field. In England he was considered an outstanding authority on disinfectants.

DR. W. CARSON RYAN, JR., Professor of Education at Swarthmore College, has been appointed Director of Education in the Indian Service, Department of the Interior.

MRS. A. F. FANGER, of Hialeah, Fla., was elected Historian of the National Congress of Parents and Teachers.

KENNETH ALLEN, Fellow A. P. H. A., sanitary engineer for the Board of Estimate and Apportionment of New York City since 1916 and who was to have been retired because of ill health, died September 9, in his home at White Plains. He was born in New Bedford, Mass., seventy-three years ago and was graduated from Rensselaer Polytechnic Institute in 1879.

KATHERINE Z. W. WHIPPLE has become secretary of the health education service of the New York Tuberculosis and Health Association, succeeding Iago Galdston, M.D., who is now director of the medical information bureau of the New York Academy of Medicine.

CHARLES O'HAGAN LAUGHINGHOUSE, M.D., Member of the A. P. H. A., State Health Officer of North Carolina, died August 26. H. A. Taylor, M.D., was named Acting State Health Officer until a successor is appointed.

DR. JOEL A. SPERRY, formerly of New Haven, Conn., is now Professor of Bacteriology at Pennsylvania State College, State College, Pa.